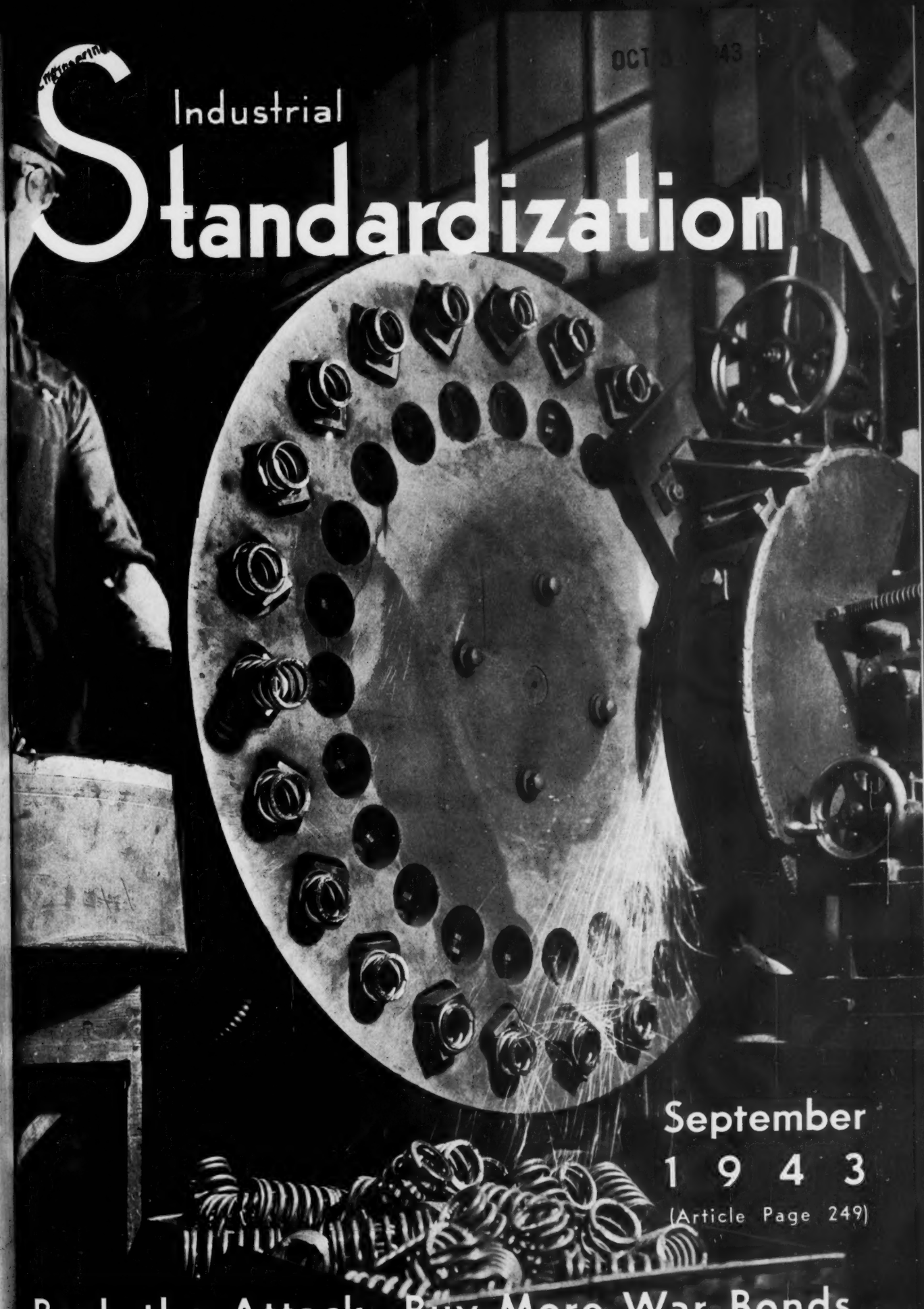
Industrial Standardization



September
1943

(Article Page 249)

Back the Attack—Buy More War Bonds

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Industrial Standardization

Published Monthly by

American Standards Association

29 West 39th Street, New York 18, N. Y.

RUTH E. MASON, Editor

Our Front Cover: Squaring the ends of coil springs in a properly guarded disc grinder with ferris wheel type of work holder. *Norton Company.*

This Issue

For the Engineer and Executive in Industry—

New Standard Aids Legibility in Engineering Graphs. By C. D. Hanscom 245
How to Prepare an Organization Chart. By Dr. John Furia 251
National Bureau of Standards' 1942 Program 254
Standard Letter Symbols Help Clarify Engineering Literature. By Dr. Sanford A. Moss 256
Letter Symbols 258
Graphical Symbols and Other Standards for Use on Drawings 260
Standards Issued by Associations and Government 261
ASA Standards Activities 266

States Act to Unify Standards for Truck Weights.... 246
Publication Compares Boiler Code and Piping Code.. 248
Kaidanovsky Assigned to War Food Administration.. 250
Standards Bureau Offers Calibration Service..... 262
Bag Manufacturers Organize for Standards Program.. 265
Standards for Radio Cable..... 267

Of Interest to Consumers—

Standard Measurements for Boys' Pajamas 246
New Flour Standards Require More Vitamins and Minerals 253
OPA Retains Standards; Drops Grade Labeling 263

Safety in Industry—

Revision Adds New Speed Rules in Abrasive Wheel Code. By A. Rousseau 249
New Standard Recommends Limit on Arsenic Fumes in Workplaces 247

ASA Starts Project on Safety Code for Bakery Equipment 259
Lighting Standard Recommended for Better Production 260
U. S. Navy Uses War Standard Safety Shoes..... 267

Foreign Standards—

CESA Is Asked to Extend Certification and Labeling Service 247
New Foreign Standards Now in ASA Library 248
British Standard Analyzes Iron and Steel Specifications 250
Canadian Association Starts Work on Sawdust Standards 265
New Committee Will Exchange Conservation Data with Britain 267

General—

New ASA Company Members 253
Standards Council Meeting 262

ASA

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Standardization is dynamic, not static. It means not to stand still, but to move forward together.

Subscription price $4.00 per year (foreign $5.00); Special to schools and libraries $2.00 (foreign $3.00); single copies 35 cents

September, 1943 Vol. 14, No. 9

Re-entered as Second Class Matter July 31, 1943, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

GUIDE	PEN	
240	3	BELL RECORD
240	4	BELL RECORD
175	6	BELL RECORD
140	6	BELL RECORD
120	7	BELL RECORD
90	7	BELL RECORD

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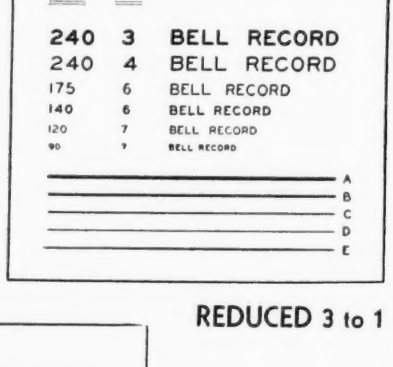

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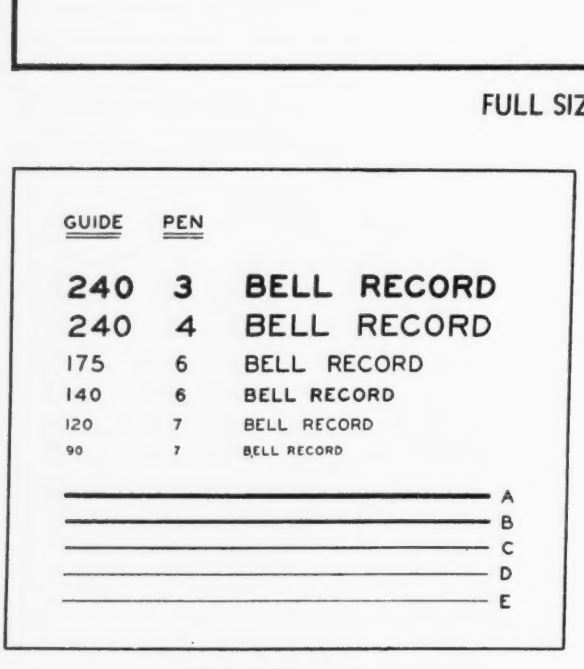

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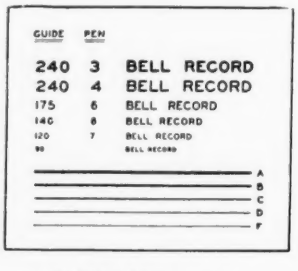

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Reduction in size affects the legibility of lettering.
Good graph-making takes this primary
principle into consideration.

New Standard Aids Legibility In Engineering Graphs

by C. D. Hanscom[1]

Member, Special Subgroup of ASA Sectional Committee on Standards for Graphic Presentation

MORE legible and more easily understandable graphs in published articles should result from the application of the new American Standard for Engineering and Scientific Graphs for Publications.[2]

Published graphs do not look the same as the originals. Normally they have been reduced by at least a two-to-one ratio, have suffered some loss in reproduction, and are surrounded by type. As a result, a good-looking original often produces an unsatisfactory illustration. The new standard offers author or draftsman concrete suggestions for graphs which will reproduce satisfactorily.

Each step in the process of producing an illustration is subject to limitations and choices. The standard endeavors to reduce these to simple recommendations which will keep an author out of trouble. Its recommendations codify existing practice or are based on scientifically established principles. Back of these recommendations is a mass of material on past practice, the optics of illustrations, vision, drafting, and printing processes.

What a Graph Should Do

The committee has weighed many factors. For example, what should a technical illustration do? The consensus is that it should complement the text, and that duplication of material in text and illustration should be as small as practicable. It is rare, of course, that a graph can tell a complete story without associated text. Furthermore, only naturally graphic material should be shown on a graph; notes and formulas, as shown by Figure 1, (page 246), should in general be relegated to the text. Also, a technical illustration should not be so conspicuous, due to heavy lines or exaggerated size, that it pulls the eye away from the text; if it does, the text might almost as well be omitted.

Most important of all, the graph itself must be legible. If any material is illegible when printed, it is worthless. Note the words, "when printed". An original graph may be superb—carefully drawn and minutely lettered on millimeter paper—but when reproduced its lettering may break down into black blobs, and the ink of its lines may clog in blotches and break down in spots, to make the printed graph useless and ugly. The new standard indicates how these dangers may be avoided.

Again, the smallest lettering on the whole graph sets the limit of legibility. If most of the lettering is large, and only a few words too small, the small words will still be illegible.

Optics and printing are involved. The eye sees in terms of the visual angle subtended by the object it is looking at; and if the object (a letter, for instance) is reduced too much, the eye fails to distinguish it (see Figure 2). Also, printing ink spreads in the paper, thickening lines and filling in corners; or, if the lines are too thin, they may fail to print at all. Tests show that the legibility of a letter (usually the critical factor in legibility) depends upon the ratio

$$\frac{\text{height of letter}}{\text{distance of eye to printed page}}$$

Where commercial lettering guides are used it will be legible if this ratio is $\frac{1}{250}$, or $\frac{1}{200}$ if slant freehand lettering is used. With good eyesight, good lighting, and printing done with unusual care, this may be reduced. Thus the practical limit of legibility of printed lettering made with commercial lettering guides is $\frac{1}{375}$, or $\frac{1}{300}$ with freehand lettering. Since conditions are not always favorable, it is safer to stick to the recommended ratios.

The standard gives specific instructions for producing these results. It lists the sizes of letters, spaces between lines, weights of lines, all in definite terms illustrated with actual examples.

Personal experience indicates that there are two troubles that a standard can only warn against. The first of these is the frequent conviction that if the original is legible, the reproduction will be also. The second is the conviction that certain material must appear on the graph even if there is no room for it with the recommended size and weight of lettering and lines.

Too often, the "solution" for this is to make the drawing of the graph larger, while keeping the lettering the same size. If the *printed* graph is enlarged

[1] Member of the Laboratories Staff, Bell Telephone Laboratories.

[2] Z15.3—1943. Prepared under the sponsorship of the American Society of Mechanical Engineers. Copies are available at 75 cents each.

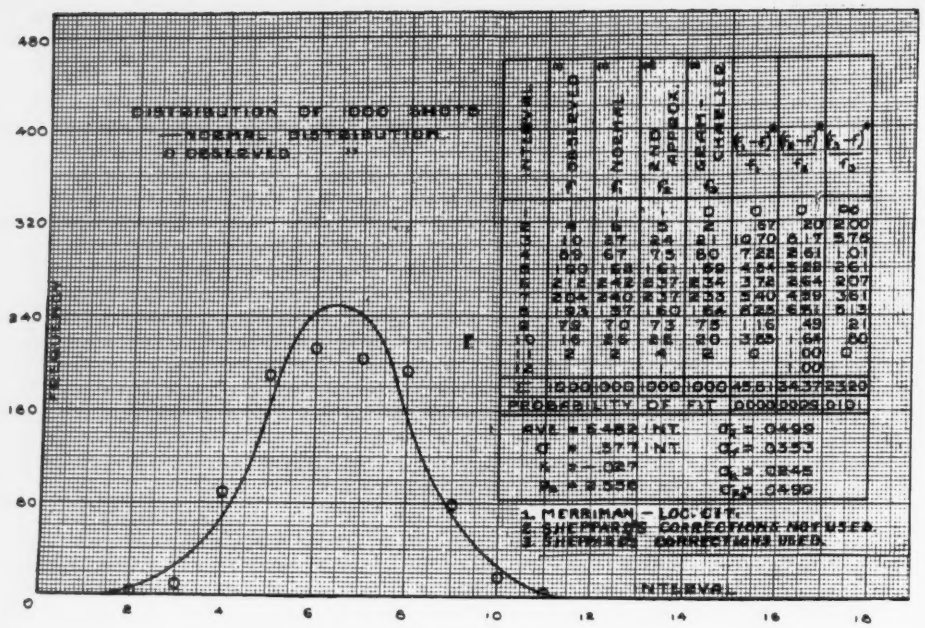
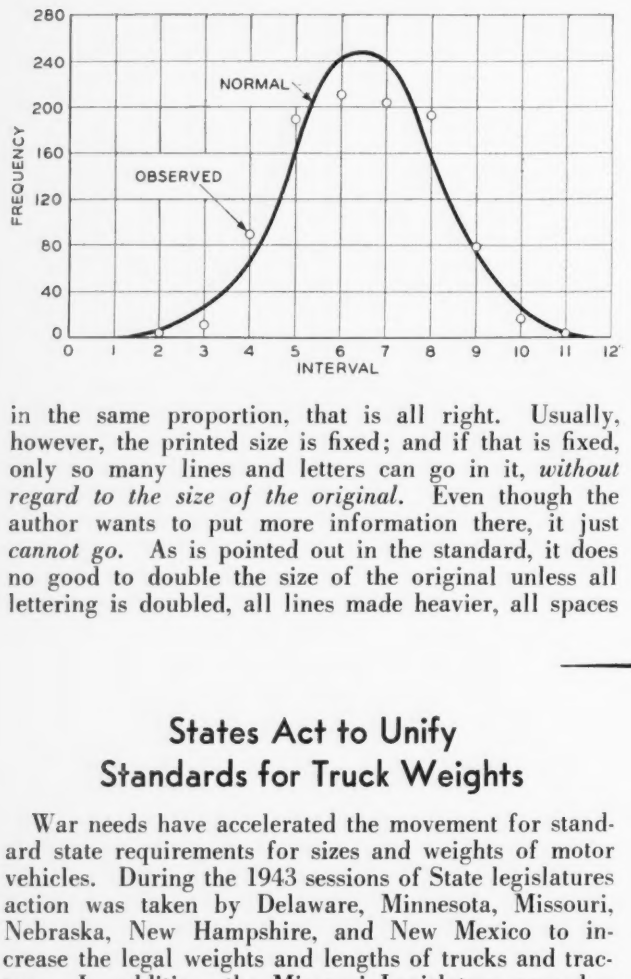


Fig. 1 (above)
Too many lines and too much information make this graph nearly illegible. The cross-hatching should be eliminated and the table should be included in the text.

Fig. 2 (below)
How a graph should look with all excess material removed.



in the same proportion, that is all right. Usually, however, the printed size is fixed; and if that is fixed, only so many lines and letters can go in it, *without regard to the size of the original.* Even though the author wants to put more information there, it just *cannot go.* As is pointed out in the standard, it does no good to double the size of the original unless all lettering is doubled, all lines made heavier, all spaces increased; otherwise the graph is likely to be illegible (hence worthless) when printed.

This is all obvious, of course; but there is nothing to lead the author to think of obvious facts outside of his own familiar field unless they are called to his attention.

This, then, is the purpose of the present standard: to bring together for ready reference those simple rules which, if followed, ensure good line-graph illustrations. Some of the rules could be worked out by anyone, some codify practical experience, but some have arisen from new and basic studies. They are all assembled here in usable form. The committee hopes and believes that they will save much time and effort.

Sectional Committee Z15 on Standards for Graphic Presentation which developed this standard was organized under the procedure of the American Standards Association with the American Society of Mechanical Engineers as sole sponsor body. Colonel Willard T. Chevalier served as chairman of the sectional committee; Dr. W. A. Shewhart as chairman of the Subcommittee on Engineering and Scientific Graphs; and H. F. Dodge as chairman of the Special Subgroup.

States Act to Unify Standards for Truck Weights

War needs have accelerated the movement for standard state requirements for sizes and weights of motor vehicles. During the 1943 sessions of State legislatures action was taken by Delaware, Minnesota, Missouri, Nebraska, New Hampshire, and New Mexico to increase the legal weights and lengths of trucks and tractors. In addition, the Missouri Legislature passed a bill authorizing the Public Service Commission to make reciprocity agreements with other states. New Hampshire enacted a full reciprocity statute and South Dakota, Tennessee, and Utah enacted new reciprocal laws. Wisconsin and Wyoming made provision for limited motor vehicle reciprocity.

Standard Measurements for Boys' Pajamas

The (Emergency) Commercial Standard for boy's pajamas, announced recently by the National Bureau of Standards, provides standard minimum measurements for the garments whether made from shrunk or unshrunk fabrics. The standard was developed at the request of the Office of Price Administration to serve as a guide for producers, distributors, and users. It is expected to help conserve essential materials, and to eliminate confusion resulting from a diversity of methods and measurements. It is also expected to provide a uniform basis for guaranteeing full size.

The standard became effective April 10.

New Standard Recommends Limit On Arsenic Fumes in Workplaces

THE increased use of arsenic in industrial processes due to the needs of war production, and the consequent increased danger of arsenic poisoning of workers, has resulted in approval by the American Standards Association of an American War Standard which defines the safe amount of arsenic fumes in the air of work places. The standard recommends a maximum allowable concentration of metallic arsenic and arsenic trioxide of 1.5 milligrams (calculated as As) per 10 cubic meters of air.

Arsenic Used in War Production

The ASA War Committee which prepared the standard found very little technical data on arsenic poisoning in industry, but it found sufficient evidence of danger to workers to make it advisable to prepare recommendations on the safe concentration. Metallic arsenic is now being used in war production as a hardening agent in metallurgical processes, in connection with the treatment of light metals, magnesium, metallic alloys, and aluminum, as well as in shot manufacture. Arsenic trioxide, on the other hand, is used largely in insecticides, weed killers, wood preservatives, and in the manufacture of glass. It is also used in large quantities for oxidative processes in the dye industry. Many companies which have hitherto had no experience with arsenic have recently started to use processes which release arsenic fumes into the air. These companies are calling for help in determining how large a concentration of arsenic fumes should be considered dangerous and how they may best protect their workers. The new standard was developed to give an answer to these questions.

Industrial Poisoning Usually Chronic

The danger of arsenic poisoning of workers has been recognized for some years. As early as 1912, cases were reported among dock laborers in London who had been working with birds' skins preserved with arsenical compounds. During the last war such poisoning greatly increased among chemists, among persons manufacturing arsenic trichloride, in glass factories, and among those working with metallurgical processes using arseniferous minerals.

Industrial arsenical poisoning is almost invariably chronic and generally arises from inhalation of arsenical dusts. This chronic poisoning produces dermatitis and ulceration of the skin, eczema of the face and hands, and irritation of the mucous membranes of the nose, mouth, and throat. It also affects the nervous system, producing severe headache and sometimes intense pains in the bones, numbness, tingling, and itching. In acute attacks the gastric and renal systems are affected. It is believed doubtful, however, that any real cases of systemic arsenic poisoning are at present occurring in industry, although there are industrial cases of arsenical dermatitis.

To determine whether the concentration of arsenic in the air exceeds the safe limits, samples of air should be taken at the breathing level, close to the mouth or nose of the worker, the standard recommends. Special attention should be given to locations near the source of the arsenic and in the path of air currents carrying the dust or fumes toward the worker. It is suggested that samples be collected in impingers in the case of dust or in electrostatic precipitators in the case of fumes.

The new American War Standard is intended to apply only to the emergency period of the war. After the war, the standard will be reconsidered by the ASA Sectional Committee on Allowable Concentrations of Toxic Dusts and Gases and will be approved as a regular American Standard or will be dropped if it is decided that it is no longer needed.

It is one of a series of standards defining the safe limits of toxic dusts and gases in the air of work places. Six American Standards define allowable concentrations for carbon monoxide, hydrogen sulfide, carbon disulfide, benzene, chromic acid and chromates, and mercury. American War Standards cover cadmium, manganese, and xylene, in addition to the standard for arsenic and arsenic trioxide.

The ASA Committee on Allowable Concentration of Toxic Dusts and Gases is now working on recommendations for safe concentrations of lead, nitrous gases, toluene, formaldehyde, carbon tetrachloride, methanol, and styrene monomer. Only the latter is going forward through the ASA War Procedure.

The two new American War Standards, Allowable Concentration of Metallic Arsenic and Arsenic Trioxide (Z37.9-1943) and Allowable Concentration of Xylene (Z37.10-1943), are now available from the American Standards Association at 20 cents each.

CESA Is Asked to Extend Certification and Labeling Service

"The satisfactory employment of the CESA Mark as a symbol of approval in the use of electrical equipment throughout Canada during the past three years has possibly been partially responsible for the submission of proposals by certain provincial boiler inspection departments for the establishing of a procedure involving the application of the mark to boilers and pressure vessels accepted by them as being in accordance with CESA Standard B51. Canadian Regulations for the Construction and Inspection of Boilers and Pressure Vessels."—*Quarterly Bulletin*, Canadian Engineering Standards Association, June 30, 1943.

New Foreign Standards Now in ASA Library

THE following new and revised standards, just received by the American Standards Association, may be borrowed by ASA Members, or ordered through the ASA Library.

Great Britain

Revised British Standards

* Code of Practice for Planning of Electric Wiring Installations Low and Medium Voltage BS1062-1943
* Color Card (superseding BS381C-1931) BS381C-1943
Copper and Brass (superseding BS24-Pt.5-1925) BS24-Pt.5-1943
Fluorescent and Phosphorescent Materials (excluding radio-active materials) (superseding ARP18-1940) ARP18-1943
Glossary of Terms Used in Electrical Engineering
Section 5, Transmission and Distribution (superseding part of BS205-1936) BS205-Pt.4-1943
Section 6, Electro-Chemistry
Section 7, Traction } BS205-Pt.5-1943
Section 8, Lighting, Heating and Domestic Appliances BS205-Pt.6-1943
* Memorandum to Consumers and Producers Regarding the Standardization of Alloy Steels with the Object of Alloy Conservation (superseding BS970A) BS970B-1943
Mineral Aggregates, Sands and Fillers, Methods for the Sampling and Testing of BS812-1943
Varnished Cambric Insulated Cables for Electricity Supply BS608-1943

New British Standards

* Camouflage Colors BS987C-1942
Code for Flow Measurement BS1042-1943
Code of Practice for the Protection of Structures against Lightning CP1-1943
Cutlery, Including Spoons and Forks BOT 17
* Diamond Tipped Boring Tools BS1120-1943
* Fine Resistance Wire for Telecommunication and Similar Purposes BS 1117-1943
Flameproof Hand-Held Electric Drilling Machines Primarily for Use in Mines BS1090-1943
Flexible Trailing Cables for Quarries and Metalliferous Mines BS1116-1943
* Hard Copper Sheet and Strip for Electrical purposes BS1110-1943
* Painting of New Public Vehicles in War Time BS1122-1943
* Paper Insulated Cables for Electricity Supply BS1107-1943
Pressure Paint Containers BS1101-1943
Principles of Production Control (first part of *Office Aid to the Factory* series) BS1100-Pt.1-1943
Recommended Methods for the Analysis of Steel BS1121-Pt.1-1943
Routine Testing of Domestic Gas Cooking Ovens BS1115-1943
* Rubber Insulated Cables and Flexible Cords (amendment 3 to BS7-1939) PD118-1943
Services Specification for Copper Rings and Strip for Driving Bands of all Projectiles and Shot STA13-1943
Small Fusion-Welded Steel Air Receivers BS1099-1943
Summary of British and American Standard Specifications for Iron and Steel BS1111-1943

Amendments to British Standards

Anti-Scatter Fabrics (amendment to ARP45) PD103
* Bayonet Lamp-Caps and Holders (amendment to BS52-1941) PD93
Code for Commercial Acceptance Tests for Steam Boilers (amendment 1 to BS845-1939) PD111
* Electric Lamps for Railway Signalling (amendment 2 to BS469-1939) PD106
* Miners' Lamp Bulbs (amendment to BS535-1938) PD104
Motor Starters and Controllers (amendment 1 to BS587-1940) PD119

* War Emergency Issues.

Amendments to British Standards—(Continued)

Overhead Line-Wire Material (Non-Ferrous) (amendment 4 to BS174-181-1938) PD105
Quality Control (amendment 1 to BS1008-1942) (supersedes PD94) PD117
* Rubber Mats for Electrical Purposes (amendment 2 to BS921-1940) PD112
Sampling of Coal and Coke (amendment 1 to BS1017-1942) PD109
* Screw Threads of Whitworth Form (amendment BS84-1940) PD99
* Springs and Spring Steel (amendment 1 to BS24-Pt.3-1942) PD110
Synthetic Resin (Phenolic) Moulding Materials and Mouldings (amendment 1 to BS771-1938) PD116
* Traction Lamps (Series Burning) (amendment 2 to BS867-1939) PD108
* Tungsten Filament Electric Lamps other than General Service (amendment 2 to BS555-1939) PD107
* Welding Plant and Equipment (amendment to BS638-1941) PD97
* Wiring on Cleats (amendment to BS1063-1942) PD62
Workhead Spindles for Grinding Machines (amendment to BS1089-1943 PD98

Standard for Aircraft Materials and Components

High Strength Plywood for Aircraft 6-V-3

Canada

Specification for Dimouts CESA/ARP No. 507 July, 1943 25¢

New Zealand

Simplified Practice for the Manufacture of Women's Footwear War Emergency NZSS E73 (SP)

Switzerland

(The following standards are available in both French and German)

Titres de périodiques Code d'abréviation SNV90100
Liste des abréviations couramment employées (Périodiques suisse et étrangers) SNV90101

Publication Compares Boiler Code and Piping Code

A comparative study of the ASME Boiler Code and the American Standard Code for Pressure Piping has been published recently in the *Official Bulletin* of the Heating, Piping, and Air Conditioning Contractors National Association. These codes are important to members of the association doing high-pressure work, since they form the basis of state and local legislation on this subject, the *Bulletin* explains. Insurance companies use such legislation, where it exists, as the standards for their inspection to determine whether the installations are insurable. In the February and March issues of the *Bulletin*, the conditions of the ASME Boiler Code and the Code for Pressure Piping were compared as a whole and comments were made on Section 1 of the Pressure Piping Code.

The American Standard Code for Pressure Piping can be obtained from the ASA; the Boiler Code from the American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y.

Revision Adds New Speed Rules In Abrasive Wheel Code

by A. Rousseau[1]

Secretary, ASA Sectional Committee on Safety Code for Abrasive Wheels

A REVISED Abrasive Wheel Safety Code (B7-1943) has been approved by the American Standards Association and is now on the press. This is the first revision since 1935 and the most extensive in the long history of this Code. Previous revisions have been relatively limited in scope, affecting one or two rules or sections only; to take care of some specific development or requirement. This time, in addition to the large number of changes required to keep pace with changes in the industry, the entire Code was carefully reviewed and many rules were rewritten to improve clearness and eliminate ambiguity without any attempt to alter the basic meaning.

The need for a revision of the Code became increasingly apparent during the period of expanding war industries. Several types of abrasive wheels and grinding operations which previously had very limited usage, found an important place in the new industries. For some of these there were no operating rules whatever in the old Code, while for others it had been necessary to resort to the use of the permissible exceptions to existing rules. The types of wheels for which entirely new rules have been written include:

Mounted wheels and points
Plate mounted wheels
Inserted nut wheels

Grinding operations for which entirely new speed rules have been written include:

Crankshaft grinding
Camshaft grinding
Thread grinding

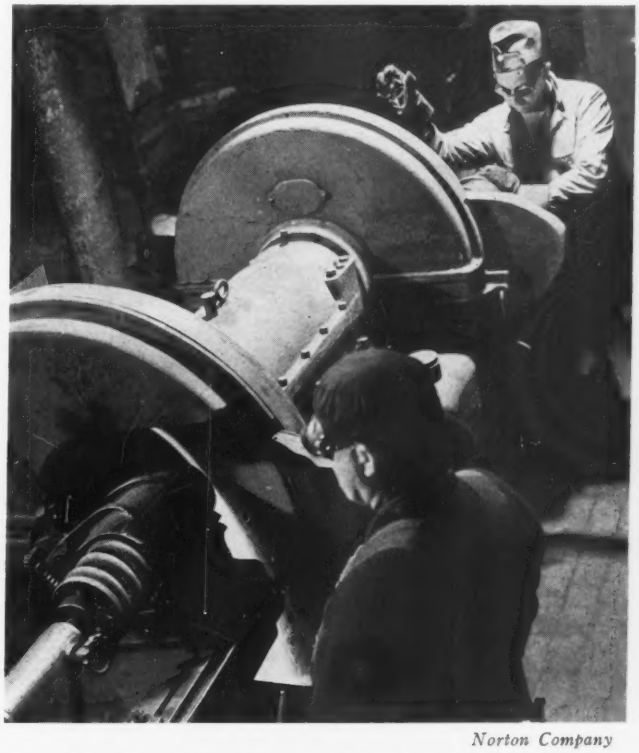
Basic speeds for other grinding operations remain unchanged, but the section on speeds has been entirely rewritten so that higher speeds may be used if and where necessary, but only under proper control. Proper relationship between testing speed and operating speed for all classes of wheels has also been clarified.

New specifications are included for drawn steel protection hoods for portable grinders. This allows the use of lighter weight guards than were required by the specifications in the 1935 edition. It is hoped that this will encourage the wider use of guards on a class of work where enforcement of the rule on guarding is frequently lax, due in part to the fact that fabricated hoods called for in the old Code were too heavy to be practical.

[1] Product Safety Engineer, Abrasive Division, Norton Company.

Considerable research and engineering work preceded the formulation of some of the new rules and specifications. The operating rules and critical speed tables for mounted wheels and points were prepared only after a comprehensive study of the whole subject requiring well over a year, and including a great deal of actual testing under controlled conditions. Before approving the lighter weight drawn steel guards for portable grinders, samples were tested by breaking wheels in them and observing the results.

A new appendix has been added which contains a great deal of valuable information on related subjects, and which should prove to be of help in promoting a better understanding of the purposes of some of the former rules in the Code proper. For instance, the difference in strength properties of various types of wheels is discussed in considerable detail. Another section of the appendix explains the meaning of "critical speed' as related to the operation of mounted points and wheels.



Norton Company

Squaring the ends of heavy coil springs on a double-end disc grinder.

Twenty Years Service On ASA Sectional Committee

A review of the sectional committee membership list appearing in the 1922 issue of the Code for the Use, Care, and Protection of Abrasive Wheels (the first under ASA procedure) reveals the following eleven names which also appear in the present (1943) list of members. These men have all served continuously since the organization of the original sectional committee in 1921, and have reviewed and helped draft each of the revisions since that time:

G. W. Chormann
A. J. Gifford
F. R. Henry
R. McA. Keown
A. Rousseau
G. E. Sanford
George J. Speidel
H. J. Weeks
S. E. Whiting
H. L. Whittemore
Professor C. E. A. Winslow

Most of the revisions were initiated by the Grinding Wheel Manufacturers Association through its Safety Committee and were then considered by the ASA Sectional Committee. Because of the extent of the revisions a special Steering Committee was appointed from the membership of the sectional committee, to serve in an advisory capacity and to guide the progress of the work. This Steering Committee consisted of the following members:

John W. Welch, *Chairman*
A. Rousseau, *Secretary*
George E. Sanford
J. B. Chalmers

Several meetings were held during the progress of the work. Mr. Rousseau, being also the chairman of the GWMA Safety Committee, served as a sort of liaison between the two committees. When the work was far enough along so that a complete draft could be prepared in page proof form, copies were sent to all members of the sectional committee and to the sponsors for study. A meeting of the sectional committee was then held at which the draft was completely reviewed. Some specific changes were made and other editorial changes authorized.

After approval of the sectional committee by letter ballot, the final draft was submitted to the sponsors for approval and through them to the Safety Code Correlating Committee and in due course to the Standards Council.

It is expected that this edition will receive widespread distribution exceeding that of any previous edition. As with previous issues, the bulk of the distribution will be through the Grinding Wheel Manufacturers Association and through the individual company members who have always made a practice of giving copies without charge to anyone having a real interest in the Code. The first printing will total 50,000 copies, and although these will not all be distributed at once, most of them will probably be in the hands of individuals who are in some way interested in the safe operation of grinding wheels before another year has passed. Copies may also be purchased from the American Standards Association at nominal price.

British Standard Analyzes Iron and Steel Specifications

An analysis of the requirements contained in both British and American standard specifications for iron and steel has just been published by the British Standards Institution. The document, known as British Standard 1111:1943, was prepared to help determine quickly whether a specification exists for any particular class of iron or steel, and to make it easy to refer to the important features of a specification without consulting a large number of separate documents.

Tables for each type of iron or steel list the standards available for that particular product and summarize the requirements of each in such a way that they can be compared. The table of contents makes it possible to find the requirements for the steel or iron in which the reader is interested, and the Index lists the specifications in their numerical order, as well as by the name of the organization issuing the standard. An Appendix summarizes the War Emergency revisions to the British Standards.

The British Standards included in the analysis cover structural steels, steels for ships, material for railways and tramways, steel plates, bars, sheets and strips, wire, wire ropes, wrought-iron plates and tubes, malleable iron castings, grey iron castings, cast-iron pipes, and steel bars, sheets, strips, tubes, and wires for aircraft materials. Steel specifications issued by various organizations in the United States are also analyzed. These include specifications issued by the Society of Automotive Engineers, National Emergency Steels issued by the War Production Board, Aeronautical Material Specifications issued by the Society of Automotive Engineers, specifications of the American Society for Testing Materials, and U. S. Federal Specifications for steels.

Copies of the book, British Standard Summary of British and American Standard Specifications for Iron and Steel (BS 1111:1943), may be ordered through the American Standards Association, or copies may be borrowed from the ASA Library.

Kaidanovsky Assigned To War Food Administration

Samuel P. Kaidanovsky, who for several years has been Chief of the Consumer Standards Section, Consumers' Counsel Division, U. S. Department of Agriculture, has now been assigned to the War Food Administration as Special Assistant to the Deputy Director of the Food Distribution Administration. His knowledge and experience will be used by the branches and divisions of the Food Distribution Administration in procurement activities and in the solution of problems related to standards.

Mr. Kaidanovsky has pioneered in standards work since he entered the Government in 1934. His experience includes the following: Chief of the Standards Unit, Research and Planning Division, NRA; Chief of the Standards Section, Consumers Project, U. S. Department of Labor; Technical Director, Consumer Standards Project, U. S. Department of Agriculture.

How to Prepare An Organization Chart

New York City issues manual outlining standard forms

by Dr. John Furia

Coordinator of War Training and Director of the Division of War Training, City of New York

NEW YORK CITY'S efforts toward solving its organization and personnel problems have contributed to the literature a manual of standards in a new field—that of organization charts.

New York City agencies have made organization charts for many years. Both the nomenclature and the information contained in these charts were often so unstandardized, however, that in some instances instead of furnishing valuable aid to the control agencies, the charts were actually next to unintelligible.

As a means of clarifying the entire situation, early in 1942 the Mayor's Committee on Simplification of Procedures was set up by executive order with power to act.

The first step toward simplification, the committee decided, should be to obtain a complete set of organization charts of New York City agencies. Such charts, if made in conformity with predetermined standards and with uniform and adequate information, could be made an important tool of the committee in planning and administering the simplification program, the committee believed. For this purpose it was decided that the charts must contain information on the functions of each agency and its subdivisions, together with the total budget of the agency and the number and grade of the personnel involved.

City Teaches Chart-Making

To assure uniformity in construction of the charts, the City Division of Training was asked to conduct training courses for the persons in each of the city agencies who were to be responsible for preparing the charts.

Two such courses were conducted, each consisting of three full-day sessions. A general background of the principles of organization and chart construction was given the first day, and the following two days were conducted as a laboratory. Techniques and standards were presented, discussed, and applied. Actual problems were brought in from various departments, and in a number of cases the chart structure for a department was virtually completed during the course.

After the conclusion of the course, the staff of the Division of Training was available for consultation. Many problems were brought in by the "graduates" of the course and practical solutions were reached in keeping with the standards set in the training course.

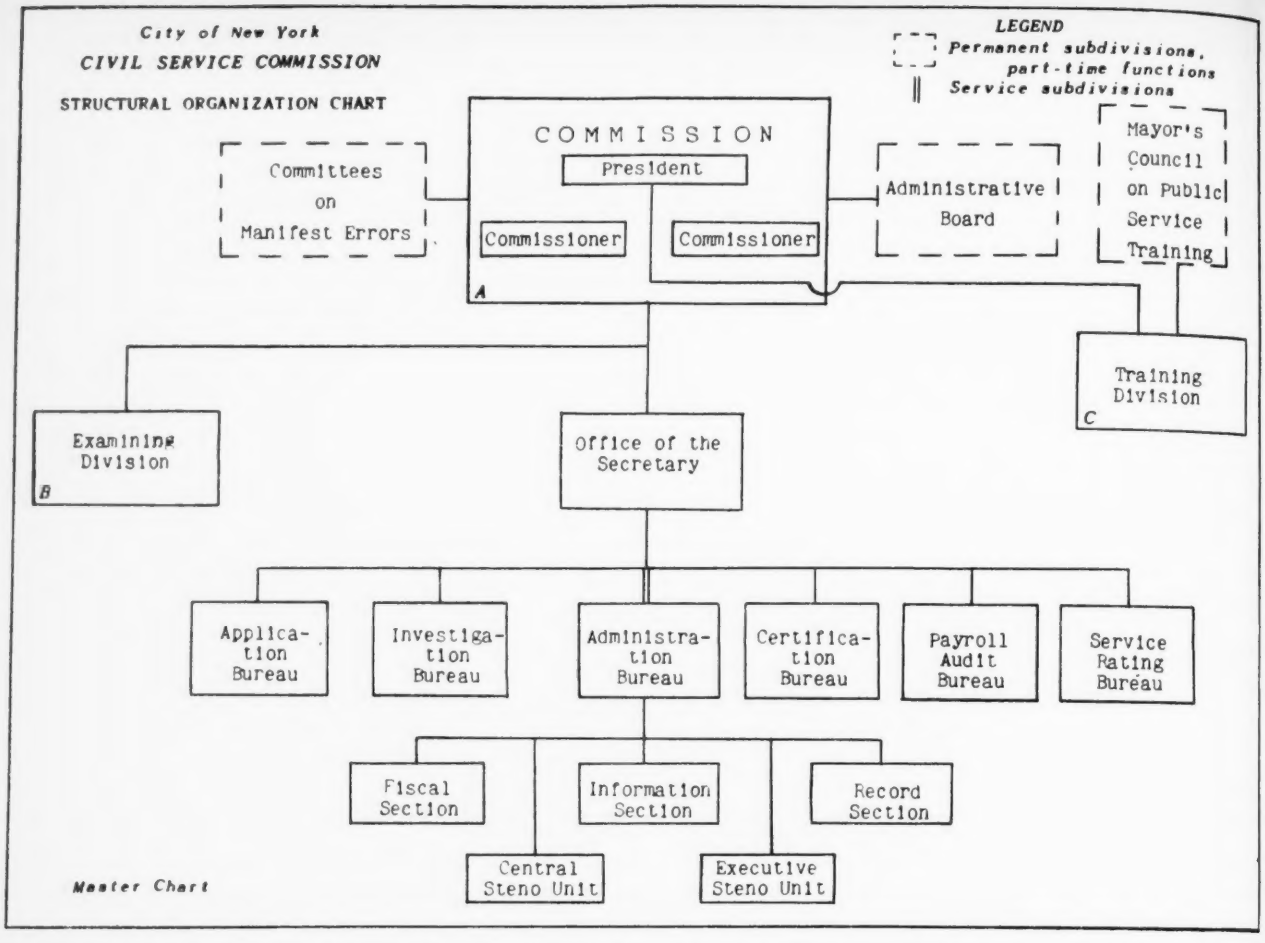
During the course, a stenotype transcript was made of all the lectures and discussions, the problems raised by the trainees, and the solutions agreed upon. In order to provide a permanent guide and a set of standards for chart-making in the City, this course material was then taken and developed into a manual[1] on the making of functional organization charts. A tentative draft of the manual was prepared and distributed to a group of experts in public administration and in industry as a means of securing the greatest possible degree of standardization. This tentative draft was revised in light of the suggestions received.

Terms Must Be Defined

A special problem which came up early in the development of the manual was the lack of standardization of the simplest organization and management terminology. Terms were used so loosely that it was necessary to define them somewhat arbitrarily and in some cases to coin definitions. As a result a glossary of chart-making terms was developed and included in the manual. It cannot be expected that all authorities will agree with all of the definitions used, but it is hoped that a forward step has been taken toward evolving a standard terminology, as well as standards for chart construction.

The manual is divided into nine sections, which define an organization chart, describe the forms and types of organization structure, and the purposes of func-

[1] The Guide to Municipal Functional Organization Charts was printed in a limited edition by the Division of Training for use by New York City agencies. To meet numerous requests by government agencies, colleges, libraries, and industry, the Executive Committee of the Mayor's Council on Public Service Training has given permission to the Graduate Division of Training in Public Service of New York University to print the manual for general distribution at cost. Copies may be obtained from the New York University Book Store, Washington Square, New York City, under the title "How to Make and Interpret Functional Organization Charts"; price 50 cents.



This sample chart illustrates the use of various kinds of lines to indicate different functions. The jog in the line from the President to the Training Division is a by-pass device to indicate that the Division is responsible only to the President and not to the entire Commission.

tional organization charts, describe the steps in constructing an organization chart, describe master, secondary and tertiary charts, and outline the uniform standards for chart construction. They also describe the practical uses of the functional organization chart, and include cautions as to the use and interpretation of charts.

The 46 diagrams illustrate the various principles and techniques in constructing an organization chart by showing correct and incorrect methods of representation. There are also examples showing charts of specific municipal agencies constructed before the formulation of the standards, and charts of the same agencies constructed after the chart-making courses were given.

In general, the purpose of functional organization charts is five-fold, it is explained. These five purposes are:

1. To get an over-all picture of the existing organizational structure
2. To discover organizational weaknesses such as:
   (a) Confused lines of authority and responsibility
   (b) Duplication of functions
   (c) Inefficient allocation of personnel
   (d) Too extended a span of control
   (e) Lack of intermediate supervisory levels
3. To discover organizational strengths which may be used in setting standards of good structure
4. To provide a basis for planning
5. To provide a basis for reorganization

In order to accomplish these purposes the manual sets specific standards for the formation of organization charts. The title, for example, appears in the upper left-hand corner; the legend in the upper right-hand corner; the identifying code or page number and total budget and total personnel budget figures in the lower left-hand corner; and the approval signature, date of approval, and name of person responsible for drawing up the chart in the lower right-hand corner.

The rectangle (not the circle, triangle, oval, or any other geometric figure) is used to designate each subdivision graphically. For a permanent full-time subdivision, the rectangle is a solid-line box. Eleven other types of subdivisions, are shown by various types of broken-line boxes. To show a permanent subdivision whose function is only occasional, for example, use a dash line box; and to show a full-time permanent subdivision which is to be created, a dot-dot-dot-dash line box is used.

The information to be contained in each box on a functional organization chart includes (1) the designation; (2) description of functions; (3) total budget of the subdivision; and (4) the number of positions and personnel budget or position breakdown of personnel budget.

Designations for subdivisions and for the officials in charge are standardized according to levels. The high-

est level subdivision, commonly known as the department, authority, board, commission, or bureau, is called the agency, and is in charge of an administrator. The agency is subdivided into divisions, each in charge of a director; managers are in charge of branches; chiefs, of sections; supervisors, of units; heads, of sub-units; and leaders, of groups.

A suggested check list for describing the functions of each of these subdivisions for chart presentation includes:

1. What is the direct activity?
2. What operations, processes, and procedures are involved in the activity?
3. How is the work supervised?
4. What subdivisions carry on the various parts of the work?
5. How is the work divided, by subject function or by area of operations, or both?

The third portion of the box, total budget, should be shown wherever possible. Office titles, followed by civil service titles in parentheses, and salaries should be indicated in the portion of the box showing personnel and personnel costs. The chart shows positions, not persons; therefore, names of incumbents are omitted. A list of symbols is included in the manual to show exceptions, such as PT for part-time position, M for military leave, etc.

Four levels of authority are differentiated: administrative; executive; managerial; and supervisory.

The administrative level is characterized by responsibility for long-range planning and over-all policy formulation and direction of the agency. The executive level is characterized by responsibility for major specific planning, policy formulation and interpretation, and direction of the agency and its higher-level subdivisions. The managerial level is characterized by responsibility for translation of policy into day-to-day planning and operation of agency subdivisions and for direction of the intermediate level. The supervisory level is characterized by direct responsibility for job planning and work of employees. This level is often broken down so that an organization may have as many as seven or more levels, the total number varying from agency to agency.

Standards are set for the method of showing various types of authority. Line authority is shown by a solid line joining the middle of the bottom and the middle of the top of the appropriate boxes. Various types of broken lines are used to show the funneling of instructions, the flow of work, a purely advisory staff relationship, and subdivisions subject to the authority of another agency. The use of the by-passing device to show lines of authority and responsibility crossing other such lines, but distinct from them, is explained in detail. The showing of staff relationships, advisory and consultary committees, functional relationships, and service subdivisions is also standardized. How to determine and distinguish between levels is indicated, and the staggering device is illustrated.

In general, the manual is intended as a guide to preparing charts which will give a quick, clear picture of what an organization is doing and through what channels it carries on its work. Through such charts it aids the administrator in discovering where there may be dual authority, or vague lines of authority, and thus, by their elimination, may lead to greater organizational unity. By revealing the effective features of some parts of the organization, such a chart may suggest ways of extending such improvements to other parts of the organization; and may even indicate possible lines of future development and expansion.

Although this manual of chart-making principles and techniques was prepared for use in New York City, it has already been found to have general interest and to be generally applicable.

New Flour Standards Require More Vitamins and Minerals

New standards for enriched flour, which increase the vitamin and mineral content to compensate for a reduction in the use of milk in bread manufacture, became effective October 1, the Food and Drug Administration announces. The new standards will put into effect a new policy. Formerly, the program had been aimed to restore to flour the vitamin and mineral content before the wheat is milled. Now, an even greater amount of vitamins and minerals are required. The inclusion of riboflavin, formerly optional in the requirements for enrichment, also helps to offset the lack of milk in many bread doughs.

The minimum and maximum amounts of vitamins and minerals required per pound of flour are as follows:

	Minimum (*Milligrams*)	*Maximum* (*Milligrams*)
Thiamin	2.0	2.5
Riboflavin	1.2	1.5
Miacin or Niacin Amide	16.0	20.0
Iron	13.0	16.5
Calcium (optional)	500.0	625.0

Food Distribution Order No. 1 issued by the Food Distribution Administration and effective July 1 requires that all white bread baked by commercial bakeries be enriched.

New ASA Company Members

The following sixteen organizations have joined the American Standards Association as Company Members since those announced in the July issue of INDUSTRIAL STANDARDIZATION:

American Pipe & Steel Corporation, Alhambra, California
J. I. Case Company, Racine, Wisconsin
Federal Machine & Welder Company, Warren, Ohio
General Machinery Corporation (Niles Tool Works Division; Hooven, Owens, Rentscheler Division; Hamilton Press Division), Hamilton, Ohio
Hunter Pressed Steel Company, Lansdale, Pennsylvania
Hytron Corporation, Salem, Massachusetts
Illinois Testing Laboratories, Inc, Chicago, Illinois
I. F. Laucks, Inc, Seattle, Washington
MacLean-Fogg Lock Nut Company, Chicago, Illinois
Measurements Corporation, Boonton, New Jersey
Michigan College of Mining & Technology, Houghton, Michigan
W. C. Norris, Manufacturer, Tulsa, Oklahoma
Sunnen Products Company, St. Louis, Missouri
Texas Engineer's Library, Agricultural & Mechanical College of Texas, College Station, Texas
Waterbury Clock Company, Waterbury, Connecticut
The Weber Dental Manufacturing Company, Canton, Ohio

National Bureau of Standards 1942 Program

Floor covering being tested for wearability before purchase by the Government for heavy-duty workrooms.

GREATLY increased activity, in all phases of its work, carried out by the largest staff ever employed at the National Bureau of Standards, is the record for 1942 shown in the Annual Report of the Bureau, just issued. At the close of the year the regular staff, including temporary employees, numbered 1,709.

The Bureau's testing and calibration work increased 33 per cent as compared with last year. Research activities were carried forward in many fields, including radio, electricity, heat and power, optics, chemistry, metallurgy, mechanics and sound, organic and fibrous materials, and clay and silicate products. Its record in handling problems submitted by the Bureau of Ordnance brought the Bureau the Navy "E" pennant last year.

Notwithstanding the war conditions, the Bureau has been able to continue some of its fundamental work on standards of measurement. Air-conditioning equipment and improved lighting have been installed in the comparator room, which is maintained at 20 C, and several series of inter-comparisons of the Bureau's standard meters with United States Prototype Meter No. 27 have been completed. Using the wave length of the standard red radiation of cadmium as a unit of length (R=6438.4696A), meter line standards were produced in the interferential ruling machine that agree with the meter as defined by the Bureau's platinum standards to 0.2 micron (1 part in 5,000,000).

The experimental work and calculations on the constant of gravitation have been completed (Research Paper 1480). The final value is $G=6.673\pm0.003\times 10^{-8}$ (cgs units).

The development of new technique in resistance thermometry and in the measurement and control of pressure has made possible a precision of 0.0001 C and an accuracy of a few ten-thousandths of a degree in measurement of the boiling point of water (steam point). Similarly, new technique has permitted measurement of the ice point and the triple point of water to an even higher accuracy. The Bureau suggests that for precision temperature measurements the ice point be replaced by the triple point of water.

The freezing point of benzoic acid can now be controlled to 0.001 C and can be used as a fixed point in the calibration of thermo-couples and resistance thermometers. The Bureau finds that this temperature (122.37 C) offers certain advantages in convenienc and precision over the boiling point of water becaus it is independent of changes in barometric pressure.

For the convenience of the radio industry, the Bureau is now broadcasting continuously on two radio carrier frequencies—5,000 and 15,000 kilocycles per second. This standard broadcasting service also includes the American Standard Musical Pitch (440 cycles per second). It also includes standard time intervals, which are so synchronized with the time service of the United States Naval Observatory as to mark accurately the hour and successive 5-minute periods.

The Bureau now has equipment which can provide 1,050,000 volts for testing at 60 cycles per second with a nearly perfect sinusoidal wave form. It also has a 2,000,000 volume surge generator for supplying electrical surges similar to those which occur in lightning

Bureau Tests Gage Blocks

One of the important services performed by the National Bureau of Standards has been the testing of various types of equipment, such as glass volumetric apparatus, hydrometers, sieves, engineering and geodetic tapes, haemacytometer chambers and cover glasses, and gage blocks. The testing and certification of precision gage blocks, which serve as master standards in the production and inspection of war materials, airplanes, tanks, trucks, guns, and ammunition, is of the most urgent military importance. Unfortunately, the Bureau explains, the demand for these blocks has been such as to encourage their production by firms without adequate experience or equipment. The testing of large numbers of seriously defective and inaccurate blocks has placed an added burden on the Bureau, without a proportionate increase in the number of satisfactory blocks made available for use. Approximately 13,000 gage blocks, or four times the number in the previous year, were measured and certified last year.

One of the important testing projects which is of general interest is the testing of dental materials for compliance with Federal and other specifications. Although much improvement in dental materials is shown, the Bureau reports, failure to meet the specifications

under which these materials are purchased is still not uncommon.

In its Chemistry division, six new standard analyzed samples have been made available: A molybdenum-tungsten high-speed steel, a high-sulfur stainless steel, a wrought aluminum alloy, a solder, and microanalytical standards of benzoic acid and acetanalide. The Bureau now issues standard samples of 126 different kinds, used for checking methods of chemical analysis in industrial and scientific laboratories, and as standards for physical measurements. Approximately 18,500 individual samples were sold during 1942, an increase of 50 per cent over the previous year.

Commercial Standards and Simplified Practice Recommendations

In addition to its scientific work in testing and research, the Bureau prepares both simplified practice recommendations and commercial standards for use by the Government and by industry. A number of simplified practice recommendations are identified in orders of the War Production Board and Office of Price Administration.

Twelve new simplified practice recommendations were promulgated during the past year, bringing the effective list to 193. More than a dozen were revised to bring them up-to-date, and the remainder were reaffirmed.

Twenty-five commercial standards, including ten new standards for domestic use, three for export, five revisions, and seven supplements were issued. Standards subsequently issued in printed form covered: Hardwood dimension lumber (exports); diamond core drill fittings; moisture regains of cotton yarns; calking lead; lead pipe; lead traps and bends; portable electric drills; driving and passing lamps for vehicles; artists' oil paints; gas floor furnaces; enameled steel utensils; oil-burning space heaters; mechanical draft oil burners; and crawler mounted, revolving power shovels, lifting cranes, dragline and clam-shell excavators (export classifications) (Spanish edition).

To aid American manufacturers in the maintenance and expansion of markets for quality products during the post-war period, and to help coordinate the efforts of industry and Government to meet foreign competition, several industries have been aided jointly by the National Bureau of Standards and the Bureau of Foreign and Domestic Commerce. This help has been in the voluntary establishment of commercial standards (printed in appropriate foreign languages), covering commodities for export. Eleven such projects, initiated or carried forward during the year, established standards for the following: Diamond core drill fittings; liquid hypochlorite disinfectant, deodorant, and germicide; pine-oil disinfectant; phenolic disinfectant (emulsifying type); phenolic disinfectant (soluble type); household insecticide (liquid spray type); hardwood dimension lumber; sanitary cast-iron enameled ware; interchangeable ground-glass joints, stopcocks, and stoppers; revolving power shovels, lifting cranes, and excavators; and diesel and fuel-oil engines.

Among the services of the Bureau is the maintenance of lists of sources of supply of commodities guaranteed to comply with the requirements of Federal specifications and commercial standards. These lists were increased last year from 860 to 887. There are now 1,459 Federal Specifications, and in addition, 473 emergency alternate Federal Specifications. All willing-to-certify sources of supply are kept currently informed of the release of revisions in, and emergency alternates for, Federal Specifications for which they have expressed an interest.

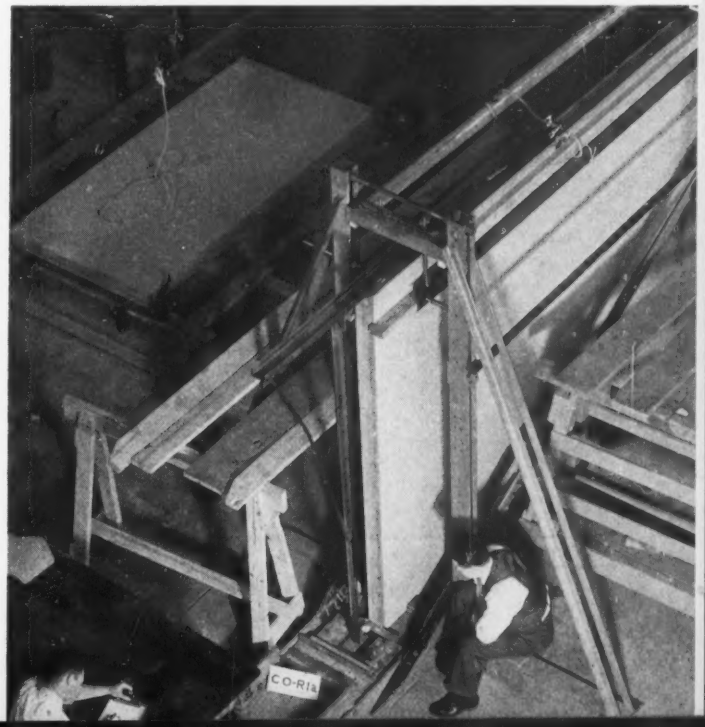
Close Cooperation with ASA

In the field of building materials and structures, tests are being carried on in connection with structural properties of house constructions, masonry and concrete walls, paints, roofing materials, surface treatment of metal, fiber building boards, floor coverings, and plumbing. The reports on plumbing compiled by the Bureau are being used by technical committees of the American Standards Association in preparing standards for plumbing materials and plumbing construction. They have also been used by the War Production Board in drawing up emergency standards for plumbing and allotting the quantities of critical materials to be used.

The Bureau cooperates closely with the American Standards Association as well as with the American Society for Testing Materials and other standards organizations. It is represented on the ASA Board of Directors; Standards Council; Electrical Standards Committee; Mechanical Standards Committee; Advisory Committee on Ultimate Consumer Goods; Safety Code Correlating Committee; and Building Code Correlating Committee. It is also represented on 103 sectional committees; and is sponsor or co-sponsor for 16 ASA projects. In line with the close cooperation between the two organizations, two members of the staff of the American Standards Association are located at the Bureau to facilitate the work.

The complete report of the National Bureau of Standards may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

The ability of adjoining walls to withstand wind pressure is being tested by the Bureau in connection with building code standards.



Standard Letter Symbols Help Clarify Engineering Literature

by Dr. Sanford A. Moss[1]

Chairman, Subgroup on Heat and Thermodynamics, ASA Sectional Committee on Letter Symbols and Abbreviations for Science and Engineering

AN engineer, or any other worker in applied science, is faced with an infinite number of problems, each concerned with his own rapidly expanding special field. Through standardization of the tools with which he works, the terms he uses, and the mathematical symbols which express his ideas, he is permitted to concentrate on the problems of his specialty. When letter symbols are standardized, for example, he need not spend mental effort on the language or form of a formula, but can give his whole attention to its underlying principles.

To provide such help for engineers and specialists working in the field of heat and thermodynamics, the American Standards Association has just approved a revision of the standard letter symbols used in this field. This standard is known as the American Standard Letter Symbols for Heat and Thermodynamics, including Heat Flow (Z10.4-1943). In addition to the list of standard symbols themselves, the document outlines the principles to be followed in the use of letter symbols generally, as well as the special principles to be applied in the selection of letter symbols for radiation and heat flow.

A Letter Symbol Defined

A letter symbol is defined as "a single character, with subscript or superscript if required, used to denote a physical magnitude in mathematical equations and expressions." When the same letter symbols are used for the same magnitudes in all publications, readers will be able to learn them readily and will be saved the appreciable amount of mental effort above mentioned. If, for example, D in a formula always denotes "diameter," there can be little chance of confusion. At the present time a university student who takes courses in engineering thermodynamics, physical chemistry, theoretical chemistry, and chemical engineering may find an entirely different set of symbols used for given concepts in each of these fields. The mental readjustment that is required each time a student starts a new recitation provides a handicap which is eliminated by symbol standardization.

In electrical science, for example, practically all publications in all languages now use the same letter symbols. This is due to the fact that pioneers in the science, which unlike many others is of comparatively recent origin, started international standardization of letter symbols for electrotechnics early in the history of electrical literature. Unfortunately, no such situation exists in other fields of science and technology.

The recently revised list of thermodynamics symbols is part of a project initiated some years ago under the procedure of the American Standards Association. The project, entitled Standardization of Scientific and Engineering Symbols and Abbreviations, was organized under the sponsorship of the American Association for the Advancement of Science, the American Institute of Electrical Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers, and the Society for the Promotion of Engineering Education.

Standard Symbols Available

As a result of the work on this project, lists of American Standard symbols in a number of fields have been issued. Some of these have been revised recently and re-issued, including the Letter Symbols for Hydraulics (Z10.2-1942); Letter Symbols for Mechanics of Solid Bodies (Z10.3-1942); Illuminating Engineering Nomenclature and Photometric Standards (Z7.1-1942); and now the Thermodynamics Symbols (Z10.4-1943). Other revised lists of symbols and some new lists are now in progress.

In all these standards particular effort has been made to use an identical symbol for those concepts which are common to several fields. Workers in one field often have become accustomed to symbols of their own, regardless of usages in other fields with respect to the same concepts. The different subcommittees have been broad-minded in avoiding such conflicts in these new lists, however, and this is expected to continue with future lists.

A completely logical list of symbols would have a single symbol for every concept, no matter in what field it might be used, and all symbols would have been selected on a sound theoretical basis, regardless of present usages. But in default of an international dictator to enforce such an allegedly logical list, it simply would not be accepted. A great many lists of symbols have been prepared and issued by committees who have proposed to reform symbols usages, but such lists have accomplished nothing beyond collection of dust on volumes of "Proceedings" in technical libraries.

We expect, on the other hand, that the American Standard lists of letter symbols will merit actual use, and so we have tried to make a realistic compromise between existing usages and idealism.

[1] Consulting Engineer, Supercharger Engineering Division, General Electric Company, West Lynn, Mass.

One such compromise has been in listing alternate symbols for certain concepts. These are of two sorts. In some cases there are alternate symbols of equal rank, denoted by listing two different symbols opposite a concept, with a comma between. In other cases, a preferred symbol for a given field is duly listed, and an alternate which is not preferred for this field but which is in use in another field, is given in parentheses or as a footnote. Alternates thus arranged have been found necessary in a few cases where a given concept has had different symbols in different fields, in each case with such widespread international usage that agreement could not reasonably be expected. An example is the use of both A and S for surface or cross-sectional area.

Alternates have been listed also in cases where there has been well established use of two different letter symbols for a given concept, one of which has been used also for another concept. The alternate symbol can then be used for one of the two concepts which have the same preferred letter symbol, and the obvious absurdity of using the same symbol for two different concepts in a given text can thus be avoided. An example of this is the use in the heat and thermodynamics standard of q for "heat flow rate" and q,Q as alternate symbols for "fluid flow rate." All three symbols have had extensive use and the listing arrangement permits use of q for "heat flow rate" and Q for "fluid flow rate" in cases where both rates occur in a heat transfer or similar text.

Rules for the Use of Letter Symbols

As a part of the ASA symbols project, the committee has prepared a general set of rules for the effective use of standard letter symbols. These General Principles of Letter Symbols Standardization are prefixed to each one of the independent standards for the various fields. The General Principles include a definition of a letter symbol as given at the beginning of this article. They also distinguish between letter symbols, as thus defined, and abbreviations, mathematical signs and operators, graphical symbols, and chemical symbols. (See article page 260.)

The general principles also provide for the use of subscripts for concepts in different fields which have the same letter symbol, in addition to the alternate symbols listed in the standards themselves.

Some of the individual lists also have special principles which apply to their own field, as well as the general principles which apply to all of the various lists for the different fields.

Standardization in general is a modern development. At one time every manufacturer of machinery made his parts to suit himself and used his own system of bolt threads, etc. Such an arrangement was considered desirable because then new bolts and other parts for repairs would have to be purchased from the original manufacturer. There is no need to go into the advantages arising from the abandonment of such ideas, and from the standardization of bolt threads, pipe threads, carburetor flanges, taper fits, and thousands of other machine items, as well as letter symbols.

There have been conservative people who have questioned the wisdom of machine standardization. The same thing has occurred to some extent with respect to the standardization of letter symbols. Some authors will ignore the advantage to their readers of the use of the same symbols which everyone else employs. Others will wait to see if everyone falls in line before abandoning their own symbol customs and adopting the standard symbols. In some cases, the reason back of such an idea is the mental inertia of the author himself. Often an author writes in terms of a heterogeneous lot of symbols to which he has become accustomed from the time he was a college freshman. It is natural that an author should feel that the symbols he knows and uses are in general use, whereas actual investigation might show equal or greater use of other symbols. Of course, the easiest and laziest procedure is that an author will continue use of his own symbols without question. The more effort that an author spends in making his symbols as well as his text easily managed, however, the more popular he will be with his readers.

Single Definition of Symbol May Confuse

A common failing, unfortunately most prevalent among the better authors, is the definition in the midst of the text of each symbol at the first place it is used. That is, the deduction of an equation is preceded by several symbol definitions: "Let V be the peripheral velocity . . ." Thus, a leading book on the theory of gases gives, in the midst of a paragraph, ν (Greek letter nu) as the symbol for "molecular density." Thereafter in the formulas, ν is used without further definition. Three or four chapters on, if the reader has forgotten how ν was defined, he must go back and search through the text to find the place where it is given. This particular book commits another serious offense, by also using λ, μ, and ν (lambda, mu, nu), as direction cosines, to define the direction of a vector, so that the symbol ν is used with a second wholly different meaning. After a few equations using ν with the second meaning, comes an equation using it with the original meaning.

The author is so engrossed in his subject, and is so familiar with his own symbols, that he assumes that his readers are equally expert, which is far from being the case. The mathematics in this particular book is very difficult and possibly the author feels that anyone who can master it does not need to have a symbol system easy to understand. Yet I, myself, and no doubt many others, often lose hours in trying to puzzle out a mathematical text because the author has not given a definite statement covering letter symbols.

Should List Symbols

Fortunately it is getting to be a common custom to include in a book or article a complete list of the symbols used. Upon completion of a few more of the American Standard lists now under way, it is to be hoped that the editors of all technical society transactions and proceedings will specify that all authors of papers must use standard symbols. It is expected that publishers of technical books will be able to make a similar requirement. Even when all of this occurs it no doubt still will be desirable that each author of a paper or book include a complete list of the letter symbols that he uses.

In some texts written for a particular field, an author has chosen symbols most convenient for him at the moment, often without consideration of symbols used in other fields. Some such books have become so popular

Letter Symbols

A DICTIONARY of letter symbols for use in a wide variety of engineering fields is fast reaching completion, through the work of the ASA Committee on Letter Symbols and Abbreviations for Science and Engineering (Z10).

This committee is now active in revising the standards prepared by an earlier committee and in preparing new standards in additional fields. At present the following new and revised standards are available:

Letter Symbols for Mechanics of Solid Bodies (Z10.3-1942)	25¢
Letter Symbols for Hydraulics (Z10.2-1942)	35¢
Illuminating Engineering Nomenclature and Photometric Standards (Z7.1-1942)	25¢
Letter Symbols for Heat and Thermodynamics, including Heat Flow (Z10.4-1943)	55¢

For a description of this latter standard see the article by Dr. Sanford A. Moss, chairman of the subcommittee which prepared it (page 250).

In addition to these standards already completed, letter symbols for mathematics and for magnitudes of electrical quantities are nearing completion.

As a further help to authors and publishers, Abbreviations for Scientific and Engineering Terms (Z10.1-1941) have been agreed upon and approved as American Standard.

A careful distinction is made in all these standards between abbreviations, graphical symbols, and letter symbols. Abbreviations are shortened forms of names and expressions used in texts and tabulations, and should not be used as symbols in equations.

A letter symbol is a single character, with subscript or superscript if required, used to designate a physical magnitude in mathematical equations and expressions. Two or more symbols together always represent a product. Letter symbols are always italicized in type, and the same symbol should be used for the same physical magnitude regardless of the units employed and regardless of special values occurring for different states, points, parts, times, etc.

Graphical symbols are conventionalized diagrams and letters used on plans and drawings. A whole series of standards, prepared by Committee Z32, provides a dictionary of usage for graphical symbols and other standard methods to follow in preparing engineering drawings. Such standard usage prevents confusion and misunderstanding and provides ready reference in case of doubt.

that successive editions have been printed, and other writers have followed the symbols customs of the original author. This causes a clash when an attempt is made to standardize a single symbol for a given concept, regardless of the field in which it is used. When such divergent practices exist, either there must be standardized a number of confusing alternates, or some authors must give up their past practices for the general good.

We have tried to arrange a set of standard symbols for heat and thermodynamics which will be used by chemists, physicists, mechanical engineers, chemical engineers, or by engineers in any other field. In a number of cases extensive search has been made of current literature in various fields, and a symbol has finally been selected on the basis of majority use, or probability of acceptance by a majority. The author, as chairman of the Subcommittee on Symbols for Heat and Thermodynamics has filed a number of exhaustive lists of usages, and will be glad to furnish copies to those interested. These lists, and correspondence about them, went back and forth among members of the subcommittee, and a final selection was agreed upon either unanimously or by a large majority, on the basis of best serving the general good.

Following are some of the cases in which selections of symbols had to be made for the thermodynamics list where divergent usages existed. The selections were based on lists of symbols used by various American, British, and continental authorities, copies of which are available.

Energy in general, or total or molal work, has the symbol E in a good many texts. In these and in many other cases U is the symbol for internal or intrinsic energy. There has been some use of E also for internal and intrinsic energy. It was decided that a definite distinction between energy in general and internal energy was desirable, and so E was selected for the former and U for the latter.

A large amount of discussion was caused by the selection of symbols for what Dr. G. N. Lewis and his followers have called "free energy," H-TS; and for the different thing called the "Gibbs Function" or "thermodynamic potential," which Helmholtz called "free energy," and which is U-TS. In these formulas generally accepted standard symbols are U, internal energy; H, enthalpy; T, absolute temperature; and S, entropy.

The discussion arose because Dr. Lewis used F for what he called "free energy," while many continental and British writers used the same symbol F for the different concept which Helmholtz called "free energy." This causes confusion in parallel use of British or continental texts, and some American texts. Dr. Rossini of the National Bureau of Standards pointed out that since F had appreciable usage, with two quite different meanings, it had best be abandoned altogether. For

this reason selection was made of the symbol *A*, for *U-TS*, following Dr. G. N. Lewis (Helmholtz called this "free energy"). And selection was made of the symbol *G* for *H-TS*, following a considerable usage. This selection requires that some American chemists give up their use of *F* for *H-TS*, since it also has been used for *U-TS*. Long discussion showed that this would make for the general good.

t For Time and Temperature

Time, and Fahrenheit or centigrade temperature, both have had such extensive use of the symbol *t* that it seemed necessary to perpetuate this double usage. There has been a great deal of discussion, however, as to what should be done when both concepts appear in a single text. In such cases there has been some use of *t* for temperature and θ for time. Some of the early masters of thermodynamics used θ for temperature, so that this symbol has become associated with the thought of temperature in the minds of many students of thermodynamics, and has been used in many texts. An appreciable majority of our subcommittee thought that from the point of view of the people who make many and varied application of thermodynamics, it was best to continue to associate θ with temperature, and that its use as a symbol for time ought not to be perpetuated. Greek tau has had an appreciable use as an alternate for *t* for time, so the following arrangement was approved by a substantial majority of our subcommittee and accepted by a substantial majority of other scientists and engineers with whom the matter was discussed:

t or τ (tau)	time
t or θ	temperature C or F (θ also is used to denote temperature difference)

This gives ample provision for avoidance of conflict when time and temperature occur in the same text.

Concepts Not Included in Standard

Various symbols for radiation and humidity were subjects of discussion. A great many different people in many different lines of work use symbols in both these subjects and there have been wide divergences in the past. Much confusion has been caused, also, by use of the same names for different concepts. The ASA project on standardization of symbols, however, does not include in its scope names or definitions. Standardization of these has been sidestepped, therefore, and only enough of a statement of a concept has been given to distinguish it clearly. Even with such sidestepping of names there still were variations in the symbols for a number of concepts. To eliminate this confusion, complete surveys were made of usages among all the different people in the various lines of work using a given concept, and the final selection was made on the basis of the symbol best suited to the largest number.

In the case of symbols for radiation a great deal of discussion resulted in complete agreement with committees of the Illuminating Engineering Society on a joint standard, American Standard Z7.1-1942. In the case of symbols for humidity, a great deal of discussion resulted in rather good agreement with meteorologists, thermodynamists, and specialists in air conditioning.

In many cases, letter symbols are the initial letters of names. The fact that different languages use different names has brought about the use of different letter symbols for the same concept in nations using different languages. For this reason, international standardization of symbols for all fields of science and technology seems impossible at the present moment. Among the peoples using the English language, however, the possibilities are much brighter.

At the present time, even though nearly the same language is spoken in the United States, Canada, England, and in other parts of the British Empire, there is great diversity in the letter symbols used in text books and other scientific publications in these countries. This is in spite of the fact that books published in each nation are used freely in the others, that colleges exchange students, and that commercial concerns in each country have affiliates overseas.

With this in mind the Royal Society of England arranged some time ago that the British Standards Institution start collaboration on lists of letter symbols for the English language, with other Empire standards associations, the Canadian Engineering Standards Association, and the American Standards Association. Both the Canadian Engineering Standards Association and the American Standards Association accepted the proposal for collaboration.

International Work on Standard

At a meeting of the International Electrotechnical Commission at Torquay in 1938, symbols for Electrical Quantities were pretty well settled internationally. The impact of war on England, however, compelled postponement of the arrangements for international collaboration on symbols in the other fields. Despite the war, the American and Canadian standards associations have continued to cooperate with each other and have considered the English point of view as far as information about it has been available. In view of this cooperation, it is hoped that the American Standards now being issued will require but little change or addition when letter symbols for the English language again come up for consideration. In the meantime, the American Standards will provide symbols for our use until this time comes, and will furnish a definite statement of the American point of view when international standards are again considered.

ASA Starts Project on Safety Code For Bakery Equipment

A new project to develop safety standards for bakery equipment has been initiated by the American Standards Association, under the sponsorship of the American Society of Bakery Engineers.

The scope of the work, which was suggested at a general conference which recommended that the project be undertaken, will cover safety standards for the construction, installation, operation, and maintenance of bakery machinery and equipment used within the bakery. Such equipment includes mixers, proofers, rounders, molders, brakes, ovens, slicing and wrapping machines, racks, troughs, and hand trucks.

The sectional committee, which will represent all groups concerned, is now being organized.

Graphical Symbols and Other Standards For Use on Drawings

Uniform presentation of engineering information on drawings is being given encouragement through the development of a series of standards by several ASA committee, Z14, Z32, and Z15.

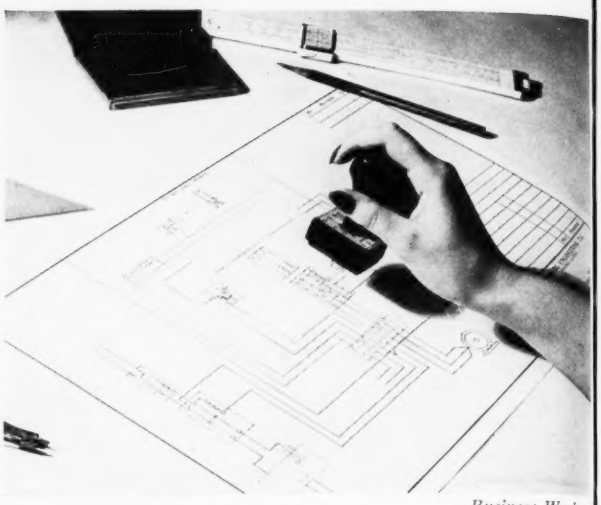
The general practice to be followed in preparing drawings is outlined in the American Standard, Drawings and Drafting Room Practice (Z14.1-1935). This standard includes such details as arrangement of views, line work, dimensioning, sheet sizes, and lettering.

For Use in Engineering and Scientific Fields

Supplementing the general standard is a series of specific standards giving graphical symbols to be used on drawings in different engineering and scientific fields. Now available in this series are graphical symbols for use on drawings in mechanical engineering (Z32.2-1941); graphical symbols for use on drawings in welding (Z32.1-1942); graphical symbols for power, control, and measurement (Z32.3-1943); graphical electrical symbols for architectural plans (Z32.9-1943); graphical symbols for telephone, telegraph, and radio use (Z32.5-1942); and graphical symbols used for electric traction including railway signaling (Z10g5-1933).

In addition, the ASA committees have considerered the problem of preparing graphs and charts for the presentation of engineering information. The American Standard Engineering and Scientific Graphs for Publications (Z15.3-1943) gives suggestions for design and layout, including scales and their designation, coordinates rulings, curves, plotted points, and their designation. More details about this standard will be found in the article on page 245 in this issue. Copies are available at 75 cents each.

Time-series charts have been a consideration, also, and a manual for their design and construction was completed and approved by the American Standards Association in 1938.



Business Week

Standard Graphical Symbols Can Be Stamped on Drawings in order to Speed Production.

Lighting Standard Recommended For Better Production

AS an answer to the question, "What is good lighting?" the Division of Labor Standards of the U. S. Department of Labor has reprinted the American Recommended Practice of Industrial Lighting in a pamphlet, *Industrial Hygiene and Plant Efficiency through Good Lighting*. The Division has reprinted the standard so that it will be available to technical personnel in the thousands of plants now in need of this practical guidance, it announces. It has been distributed to the Special Agents of the National Committee for the Conservation of Manpower in War Industries for use in their work. Additional copies have been offered to the agents by the Division for distribution to industries which they contact.

"We all know that good lighting speeds production," the Division declares in announcing publication of the pamphlet. "It is essential to the health, safety, and efficiency of workers. Without it eyesight may be impaired, accidents and spoilage of material will increase, and production will slow down. But if each job is lighted to make vision clear and easy, then better and faster production will result and vital manpower will be conserved."

The American Recommended Practice of Industrial Lighting (A11-1942) was prepared under the sponsorship of the Illuminating Engineering Society and approved by the American Standards Association in 1942. The primary purpose of the standard has been to present the principles of good lighting practice, the vital correlation between lighting and plant safety, the salient differences between good and poor illumination and some of the precautions which must be observed before adequate and suitable lighting (and hence good seeing) can be achieved and maintained.

Standards Issued by Associations and Government

(See "ASA Standards Activities", page 266 for new American Standards and progress on ASA projects)

For the information of ASA Members, the American Standards Association gives here a list of the standards received during the past month by the ASA Library for its classified files. With the increasing amount of material being received it has been decided to eliminate from the monthly list a few of those standards which may not be so important to ASA Members, such as Federal Specifications for foods. The list below, therefore, includes only those standards which the American Standards Association believes will be of greatest interest to Members in connection with their war production.

The standards listed may be consulted by ASA Members at the ASA Library, or copies may be obtained from the organization issuing the standard. Addresses of these organizations are given for your convenience.

Associations and Technical Societies

American Iron and Steel Institute (350 Fifth Avenue, New York, N. Y.)

Steel Products Manual, Railway Track Materials Section 19 August, 1943 25¢

American Welding Society (33 West 39th Street, New York, N. Y.)

Spot and Seam Welding of Low Carbon Steel 10¢

Anti-Friction Bearing Manufacturers Association, Inc. (60 East 42nd Street, New York, N. Y.)

Ball and Roller Bearing Standard Specification October, 1942

The Canning Trade (Baltimore, Maryland)

1943 Almanac $1.00

National Electrical Manufacturers Association (155 East 44th Street, New York, N. Y.)

Carbon, Graphite, and Metal-Graphite Brush Standards Publication No. 43-85 25¢

Pacific Coast Building Officials Conference (124 West Fourth Street, Los Angeles, California)

Uniform Building Code 1943 Edition $2.00

U. S. Government

(Wherever a price is indicated, that publication may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C. Otherwise copies of the document may be obtained from the governmental agency concerned.)

National Bureau of Standards (Washington, D. C.)

Dead-Weight Machines of 111,000- and 10,100-pound Capacities Circular C446 June 1943 5¢

Simplified Practice Recommendations

In Print

Cloth Window Shades R199-43 Effective March 1, 1943 5¢
Glass Containers for Green Olives R196-42 Effective November 1, 1943 5¢
Grocers Paper Bags R42-43 (supersedes R42-25) 5¢

Federal Specifications Executive Committee (U. S. Treasury Department, Washington, D. C.)

Federal Specifications

(Copies available from Superintendent of Documents, Government Printing Office, Washington, D. C.)

The date after the title of the specification indicates when it becomes effective.

Ammonium-Chloride; (sal ammoniac) (amendment 3) O-A-491 July 15, 1943
Blue-Lead; basic-sulphate, dry and paste-in-oil (superseding E-TT-B-486, 4/25/42) TT-B-486 August 15, 1943
Brass, Commercial and Naval; castings (amendment 3) QQ-B-621 August 15, 1943

Federal Specifications—(Continued)

Bronze, Manganese; castings (including manganese-aluminum-bronze) (amendment 2) QQ-B-726b August 15, 1943
Carpets and Rugs:
  Axminister (superseding E-DDD-C-51a, 8/25/42) (amendment 1) DDD-C-51a August 1, 1943
  Velvet, Plain and Twisted-Pile (superseding E-DDD-C-61b, 8/25/42) DDD-C-61b August 1, 1943
  Wilton (superseding E-DDD-C-71a, 8/25/42) (amendment 1) DDD-C-71a August 1, 1943
Cheesecloth; for wiping purposes (remnants and seconds) (amendment 2) DDD-C-301 August 1, 1943
Cloths; wiping (superseding DDD-C-491, 6/28/32) DDD-C-491a August 1, 1943
Compound:
  Cleaning, Soap-Abrasive-Type (for painted surfaces) (amendment 1) P-C-565 August 15, 1943
  Grease-Cleaning, Solvent-Emulsion-Type (amendment 1) P-C-576 August 15, 1943
Duck, Cotton; fire, water, and weather resistant (amendment 1) CCC-D-746 September 15, 1943
Enamel; lusterless, olive-drab (primarily for non-military use) (amendment 1) TT-E-514 August 15, 1943
Floor-Coverings; felt-backed (amendment 1) LLL-F-471 September 1, 1943
Grinders; electric, portable W-G-663 (new) August 1, 1943
Lamps; electric, incandescent, miniature, tungsten-filament (amendment 5) W-L-111b August 15, 1943
Leather; strap, black or russet (superseding KK-L-271) KK-L-271a September 1, 1943
Linoleum:
  Battleship (amendment 1) LLL-L-351a September 1, 1943

Linoleum—(Continued)

Inlaid and Molded (amendment 1) LLL-L-359 September 1, 1943

Plain, Jaspe, and Marbleized (amendment 1) LLL-L-367 September 1, 1943

Oil:

Linseed, Raw (amendment 2) (superseding amendment 1 and E-JJJ-O-336, 1/6/42) JJJ-O-336 August 1, 1943

Linseed, Boiled (superseding amendment 1 and E-JJJ-O-331, 1/6/42) (amendment 2) JJJ-O-331 August 1, 1943

Paint:

Concrete and Masonry, Exterior Eggshell-Finish, Ready-Mixed White and Tints (amendment 2) TT-P-24 August 15, 1943

Exterior-Primer, Ready-Mixed, White (Undercoat for Wood) (amendment 1) TT-P-25 August 15, 1943

Oil, Exterior, Ready-Mixed, Light-Tints and White (superseding TT-P-36a; TT-P-101a; TT-P-156; and E-TT-P-36a, E-TT-P-101a, E-TT-P-156, 8/28/42) TT-P-40 August 1, 1943

Paulins and Covers; duck (tarpaulins) (superseding E-K-P-146 9/10/42) K-P-146 August 15, 1943

Polish, Shoe; paste (new) P-P-567 August 15, 1943

Red-Lead; dry and paste-in-oil (superseding amendment 1 and E-TT-R-191a, 4/24/42) TT-R-191a August 15, 1943

Sanders, Portable; belt, disk, and oscillating (new) OO-S-101 September 15, 1943

Sheathing-Board; gypsum (new) SS-S-276 August 15, 1943

Sheeting:

Cotton, Bleached, Wide (superseding CCC-S-271) CCC-S-271a August 15, 1943

Cotton, Unbleached, Wide (superseding CCC-S-291, 1/6/31) CCC-S-291a August 15, 1943

Soap; low-titer (for low-temperature washing) (amendment 1) P-S-600 August 15, 1943

Soap, Potash-Linseed-Oil; liquid and paste for floor and general cleaning (superseding E-P-S-603, 4/29/42) (amendment 1) P-S-603 August 15, 1943

Stencil-Outfits (Letters and figures); metallic (new) RR-S-714 August 1, 1943

Switches:

Snap, Single-Unit, Interchangeable, Flush-Type with Wall-Plates (superseding amendment 1 and E-W-S-896, 3/27/42) (amendment 2) W-S-896 August 15, 1943

Snap, Multiple-Type and Combination Devices, Flush-Type with Wall-Plates (superseding amendment 1 and E-W-S-893, 3/27/42) (amendment 2) W-S-893 August 15, 1943

Tile; asphalt (superseding SS-T-306, 5/1/34) SS-T-306a August 15, 1943

Tubes; condenser and ferrule-stock, admiralty-metal (superseding WW-T-756, 5/2/33) WW-T-756a August 15, 1943

Tubing, Aluminum-Alloy (AL-24) (Aluminum-Copper-Magnesium [1.5%]-Manganese); round, seamless (new) WW-T-785 August 1, 1943

White Lead:

Basic-Carbonate, Dry, Paste-in-Oil, and Semipaste Containing Volatile Thinner (superseding amendment 4 and E-TT-W-251a, 4/25/42) (amendment 5) TT-W-251a August 1, 1943

Basic-Sulphate, Dry and Paste-in-Oil (superseding E-TT-W-261a, 3/14/42 (amendment 1) TT-W-261a August 1, 1943

Zinc-Oxide:

Dry and Paste-in-Oil (superseding Errata 1 and E-TT-Z-301, 4/25/42) TT-Z-301 August 1, 1943

Zinc-Oxide—(Continued)

Leaded, Dry and Paste-in-Oil (superseding Errata 1 and E-TT-Z-321, 4/25/42) (amendment 2) TT-Z-321 August 1, 1943

Emergency Alternate Federal Specifications

Bandages; gauze, compressed E-DDD-B-51 July 5, 1943

Bandages, plaster of paris (superseding E-GG-B-101a, 5/1/43) E-GG-B-101a July 5, 1943

Blanket; rubber E-ZZ-B-426 June 17, 1943

Boxes; fiber, corrugated (superseding E-LLL-B-631a, 3/19/42) E-LLL-B-631a July 7, 1943

Fasteners; paper, brass (superseding E-FF-F-101, 9/25/42) E-FF-F-101 June 14, 1943

Gauze; plain E-CCC-G-101a July 5, 1943

Hair; horse curled E-C-H-111 July 20, 1943

Hardware, Builders':

Locks and Lock-Trim (superseding E-FF-H-106 and Appendixes I, II, III, IV, 4/2/42) E-FF-H-106 June 23, 1943

Hinges (Nontemplate) (superseding E-FF-H-116b and Appendixes I, II, III, IV, 4/2/42) E-FF-H-116b July 1, 1943

Door-Closers (superseding E-FF-H-121a, 4/2/42 and Appendixes I, II, III, IV, 4/2/42) E-FF-H-121a July 1, 1943

Hardware and Fittings; for lavatory-partitions and inclosures (superseding E-FF-H-136, 4/2/42, and appendixes I, II, III, IV, 4/2/42) E-FF-H-136 July 1, 1943

Hose:

Chemical (superseding E-ZZ-H-421a, 4/25/42) E-ZZ-H-421a June 9, 1943

Gasoline, Wire-Stiffened (superseding E-ZZ-H-471, 11/24/42) E-ZZ-H-471 June 9, 1943

Tender, Corrugated, Locomotive (superseding E-ZZ-H-581, 6/9/42) E-ZZ-H-581 July 12, 1943

Kits (Empty), First-Aid, Burn-Treatment, and Snake-Bite; and kit contents E-GG-K-391 July 5, 1943

Plaster; adhesive, surgical (superseding E-U-P-401, 1/28/43) E-U-P-401 July 5, 1943

Sheeting; rubber (superseding E-ZZ-S-311a, 12/4/42) E-ZZ-S-311a June 5, 1943

Sleeves; dredging (superseding E-ZZ-S-451, 2/3/43) E-ZZ-S-451 July 12, 1943

Syringes; fountain, rubber (superseding E-ZZ-S-916, 4/12/43) E-ZZ-S-916 July 12, 1943

Tape; rubber, insulating (superseding E-HH-T-111a, 1/28/43) E-HH-T-111a July 1, 1943

Tubing; rubber (superseding E-ZZ-T-831b, 6/17/42) E-ZZ-T-831b June 5, 1943

Cancellations

Aluminum-Alloy; forging, heat-treated E-QQ-A-367a

Hot-Plates; electric E-W-H-636

Lamps; electric, incandescent, large, tungsten-filament E-W-L-101d

U. S. Department of Labor (Children's Bureau, Washington, D. C.)

Advisory Standards

Operation of Metal-Working Machines No. 7 May, 1943

Welding Occupations No. 6 April, 1943

Standards Bureau Offers Calibration Service

The National Bureau of Standards has offered its services to the Governments of the other American Republics if they wish at any time to calibrate their standards of weights and measures with the standards at the Bureau. The offer was made by Dr. Lyman J. Briggs, director of the National Bureau of Standards, at the First National Congress of Physics of Mexico. Dr. Briggs referred in his address to the fact that the International Bureau of Weights and Measures at Paris is at present isolated from the republics of the world. Therefore, the primary standards deposited at the International Bureau of Weights and Measures, which in the past were used for the calibration of secondary standards in other parts of the world, are now inaccessable. Since the National Bureau of Standards at Washington, however, has standards that have been calibrated against those deposited at the International Bureau, the standards of other countries can successfully be compared with those of the National Bureau of Standards.

The Standards Council meeting originally scheduled for September 23 has been cancelled.

OPA Retains Standards; Drops Grade Labeling

FURTHER action has been taken by the Office of Price Administration during the past month to bring its price regulations into line with the requirements of the Taft Amendment to the Emergency Price Control Act. This amendment specifically prohibits the OPA "to require the grade labeling of any commodity." It also provides that OPA may not use standards in price regulations unless such standards are already in general use in the trade, are required by Government agencies, or unless the Administrator finds that there is no practicable alternative for securing effective price control.

In carrying out this provision, the OPA has just completed a study of the 444 price orders now in effect. As a result of the study, a series of Supplementary Orders have been issued, which amend the preamble of some 250 price orders to show that they conform with the requirements of the Taft Amendment. These Supplementary Orders became effective September 11. The OPA announces that 161 of the orders contain established trade standards; five use standards previously required by Government agencies other than OPA; and 27 contain standards used either by the trade or required by another Government agency. In addition, the OPA has decided that it is necessary to continue the standards established in 57 of the regulations because no practicable alternative exists for securing effective price control.

This latter action has operated to protect a number of industries, OPA reports. Without such standards, it declares, the Administrator would have been forced either to adopt a complicated formula or "freeze" type regulation for each commodity in an attempt to make ceiling prices reflect differences between the grades of that commodity or, instead, to ignore such differences and strike some average price for the commodity which would have been too high for some articles and too low for those of superior value. In many cases, abandonment of standards would have upset established practices with which business men have become familiar and would have led to chaotic conditions in some industries. In other cases, standards of an informal character, which have never attained official recognition in the trade, have been accepted and formalized by OPA. These include regulations dealing with used refrigerators, used vacuum cleaners, and used typewriters, OPA explained. Where wartime scarcities have made obsolete pre-war standards approved by industry, OPA has had no alternative but to devise new standards suitable to present conditions, OPA officials report. Industry would have been forced to do the same had there been no Government regulation, they declare. In this group are rubber drug sundries and coil and flat bedsprings with non-steel frames.

"Representatives of the canning industry have indicated that they believe that there are other practical alternatives for securing effective price control than the use of the standards contained in Maximum Price Regulation 306 covering canned fruits and vegetables," the *Journal of Commerce*, September 13, reports. Price Administrator Prentiss Brown has, therefore, arranged for a meeting with the canners at which they will be given the opportunity to present their views. He has stated, however, that he has found no practical alternative to the use of the standards set forth in the regulation.

Recent reports from Washington indicate that the Boren Committee of the House of Representatives, which has been investigating the standardization and grade labeling activities of the Office of Price Administration, is planning to reopen its hearings promptly and may attempt to complete its report within two or three weeks.

Congress did not define grade labeling in its prohibition against "the grade labeling of any commodity," and no definition of the term is given in the Taft Amendment or in the published discussions leading up to its passage.

During the last month, however, compulsory grade marking or labeling requirements in price regulations have been revised or eliminated entirely to comply with the amendment. In some cases, a descriptive labeling requirement has been substituted in place of labels showing the grade; in others, producers, manufacturers, and wholesalers are given an option of marking the grade on their invoices rather than using grade labels.

As announced in INDUSTRIAL STANDARDIZATION last month (page 238) the grading and grade labeling requirements of the two regulations covering beef, veal, lamb, and mutton carcasses, and wholesale cuts, after being repealed by the OPA, were continued by order of Director Vinson of the Office of Economic Stabilization. In continuing the grade labeling requirements for meats the Office of Economic Stabilization pointed out that the requirements for federal grading and grade marking had been recommended by the industry itself and welcomed by the industry during the nine months they had been in effect under the OPA regulations.

The changes made in other OPA regulations do not prohibit sellers from continuing to mark their products according to grades, and indications that many manufacturers would continue to grade label their products voluntarily were expressed in the OPA announcements revoking the compulsory provisions on rubber heels and anti-freeze.

Following is a summary of the OPA actions on grade labeling taken to conform to the Taft Amendment:

Foods

Beef, Veal, Lamb, and Mutton (Revised Maximum Price Regulations 169 and 239).

The grading and grade labeling provisions formerly required by these regulations are maintained by OES Regulation No. 1, effective August 5, 1943. All of these meats must be graded according to USDA grades by federal graders. The grades must be marked on each carcass and wholesale cut and must be left on retail cuts.

Butter (Maximum Price Regulation 289).

The required grade labeling on the wrapper or carton of "93 Score" or "Grade AA" print butter was revoked by Amendment 20, effective August 17.

Foods—(Continued)

Canned Fruits and Vegetables (Maximum Price Regulation 306).

The requirement that packers must label their products by grade where more than one grade was marketed under the same brand name was eliminated by Amendment 13, effective August 5, 1943. Packers are now required only to state grades on their invoices.

Certain Foods at Wholesale and Retail (Maximum Price Regulations 421, 422, and 423).

These simplified over-all markup regulations (covering most dry and perishable grocery items) required that wholesalers and retailers who package an item bought in bulk, the grade of which is shown on the bulk container, must likewise show the grade on the bag or container they sell. This provision was revoked by Amendments to each regulation, effective July 27, 1943, except for perishables at retail which was effective August 8. The requirement that retailers must post with their selling prices the grades of eggs sold was maintained.

Dry Edible Beans (Maximum Price Regulation 270).

By amendment No. 7, effective August 5, 1943, compulsory grade labeling of dry edible beans by country shippers was revoked. It is required, however, that the U. S. grade be shown on the invoice or other documents of sale. If the country shipper wishes, he may continue to state the U. S. grade (and appropriate State grade if required by State regulation) on his labels or containers, provided no other than these two official grade designations is employed.

Eggs (Maximum Price Regulation 333).

The requirement that containers must be labeled showing the U. S. grade, size, and weight class of eggs sold by producers, packagers, and wholesale distributors was revoked by Amendment 12, effective August 13. In place of this requirement, a statement must be given the purchaser setting forth the grades and sizes, or weights, of the eggs sold and containing also the name and address of both buyer and seller, the date of delivery, and the prices charged. Retailers are not affected by this regulation and must continue to post the grades of eggs along with their selling prices.

Peanuts (Maximum Price Regulation 336).

Amendment 2, effective August 5, 1943, removes the provision for labeling of "extra large" and "medium" grades of Virginia raw shelled peanuts according to USDA grades. Shellers now need only to give this information on their invoices, but they may, if they wish, continue to state the U. S. grade on a tag or label attached to the bag or container.

Sausage and Sausage Products (Maximum Price Regulation 389).

In place of the requirement that the grade of sausage and type of casing be shown on the container or directly on the product itself, a descriptive labeling requirement has been substituted. Under this revision ingredients must be listed in the order of their importance on wholesale containers and on a band or tag attached to the retail container or the product itself.

Variety Meats and Edible By-Products (wholesale) (Maximum Price Regulation 398).

Grade labeling of livers and sweetbreads was revoked by Amendment 1, effective August 9, 1943. The requirement that the term "canner" be used to designate mutilated and spotted tongues was retained since it conforms to long established industry practice.

Clothing and Textiles

Bed Linens (Revised Price Schedule 89).

The provision that bed linens not meeting the minimum standards set forth in RPS-89 be labeled "sub-standard" was eliminated through Amendment 11, to become effective August 17.

Rayon Hosiery (Maximum Price Regulation 339).

As announced in a press release (OPA 2795, July 15, 1943) women's rayon hosiery is no longer required to be marked Grade A or Grade B. Manufacturers and sellers are not prohibited from using the grade symbols, if they wish. All other marking requirements, including gauge or needle count and ceiling price will continue in force.

Rubber Products

Rubber Heels (Maximum Price Regulation 200).

Compulsory grade labeling for V heels was removed by Amendment 11, effective August 5, 1943. Manufacturers may, if they prefer, continue to use the V symbols, provided their products meet the specifications indicated by the symbol used. Prices continue to be based on the physical tests, each brand being placed in the price class in which it is determined by abrasion and tensile strength tests to fall. Wholesalers and repairmen must abide by the prices established for any V-marked heels on hand and will follow the prices established according to brand name for heels not marked.

Lumber

Prime Grade Hardwood Logs (Maximum Price Regulation 313).

The required marking of the words "prime grade" on such hardwood logs was removed by Amendment 5, effective August 10, 1943.

Southern Pine Lumber (Revised Maximum Price Regulation 19).

The requirement that "special soft texture finish" pine lumber be marked as such by the manufacturer has been revoked. No. 2 longleaf common dimension lumber also no longer need be grade marked when the $2.50 per 1,000 board feet premium is charged for material of extra strength.

Paper and Paper Products

Fine Papers (Maximum Price Regulation 400).

Merchants, on sales of job lots and second quality papers, are no longer required to show the quality of such papers on the wrapping. Statement of the quality on either the invoice or the wrapping is permissible under Amendment 1, effective August 19.

Kraft Wrapping Paper (Maximum Price Regulation 182).

Manufacturers of Kraft "No. 1," "Superstandard", "Imitation" and unbleached "No. 1 Kraft butchers" wrapping paper formerly required to stencil or label the grade on each roll or bundle are now required merely to state the grade on the invoices. They may continue to stencil or label each roll or bundle if they wish.

Miscellaneous Commodities

Anti-freeze (Maximum Price Regulation 170).

The requirement that producers mark their anti-freeze "standard" or "substandard" to indicate its strength was withdrawn by Amendment 6, effective August 16. It is required, however, that the number of gallons of anti-freeze which must be added to a gallon of water to reduce the freezing point of the mixture to 19 degrees below zero Fahrenheit must be shown on the label. Or as an alternative method, an anti-freeze protection table showing the amount of anti-freeze needed to lower the freezing point of the radiator solution to 10 degrees below zero Fahrenheit may be shown. The designation "standard" may be continued in use, if the producer wishes, and if the anti-freeze is such that ¾ gallon or less when added to one gallon of water will reduce the freezing point of the mixture to 10 degrees below zero Fahrenheit or lower.

Burley Tobacco—1942 crop (Maximum Price Regulation 283).

It was required that warehousemen state the grade on a tag attached to each basket of Burley tobacco. Amendment 4 revoked this requirement for the 1942 crop.

Standards and Specifications in OPA Price Regulations Issued During August

West Coast Logs (Revised Maximum Price Regulation 161, Amendment 7)

Uniform grading and scaling rules for logs produced in Oregon and Washington west of the Cascade Mountains have been developed by the OPA in cooperation with the industry in that area. Minor variations in the rules previously used by the principal grading and scaling bureaus in that area have been resolved. The new rules will provide uniform grading quality and scaling quantity for all logs graded and scaled in the territory. They have been incorporated in the regulation and became effective August 24, 1943.

Retreaded and Recapped Rubber Tires and Retreading and Recapping Services (Revised Price Schedule 66, Amendment 5, effective August 2, 1943)

Dollars-and-cents ceiling prices for recapping, with ground grip treads, truck and bus tires of sizes not previously specifically priced were added to this schedule in response to requests from the tire recapping industry. Specifications issued by the War Production Board for camelback of grades A, C, and F are adopted by the OPA. Minimum quality specifications for retreading and recapping services previously provided in RPS 66 are made applicable to the new sizes covered by this amendment.

Aromatic Red Cedar Lumber (Maximum Price Regulation 454, effective August 24, 1943)

The January 1943 Rules of the National Hardwood Lumber Association are followed in establishing prices for direct-mill sales of red cedar covered by this regulation. A flat ceiling of $67.00 per thousand is set for No. 1 Common or Better of one inch thickness in standard widths and lengths. Ceiling prices of other grades and sizes are established in relation to this grade.

Cotton Linters and Hull Fibres (Revised Maximum Price Regulation 191, effective August 17, 1943)

In a revision of MPR 191, specific prices are set for chemical and "free" cotton linters and hull fibres. Cents-per-pound prices, f.o.b. sellers' shipping point, based upon an alpha cellulose content of 73 percent are established for chemical cotton linters, and upon an alpha cellulose content of 70 percent for hull fibres. Increases or deductions are specified for linters and hulls of cellulose content above or below these standards. Off-grade chemical cotton linters are those released by the War Production Board as unsuited for chemical uses and are specifically priced. Cents-per-pound prices for free cotton linters are established according to U. S. grades as described in Service and Regulatory Announcement No. 94 of the U. S. Department of Agriculture.

Groundwood Specialty Papers (Maximum Price Regulation 449, effective August 25, 1943)

Groundwood specialty papers are defined as "a type of paper other than newsprint paper which contains 26 percent or more of groundwood pulp and which is prepared for one or more of a large variety of end uses most of which fall within the field of printing and publishing." Dollar-and-cent ceilings are established for 33 grades. Specifications in terms of minimum quality of finish, percentage filler, test for brightness, etc, are provided in accordance with the practices of the industry. Accompanying the stated maximum base prices for the listed grades, minimum standard basis weights are specified together with applicable lightweight differentials which follow closely those currently prevailing in the trade.

Alfalfa Meal (Maximum Price Regulation 456, effective August 25, 1943)

Definitions adopted by the Association of American Feed Control Officials are incorporated in this regulation. A maximum price based on 17 percent protein dehydrated alfalfa meal is set. Other grades and varieties are priced in relation to this grade.

Crude Petroleum (Maximum Price Regulation 436, effective August 19, 1943)

Producer's prices for crude petroleum were removed from RPS 88 and incorporated into this new and simplified regulation. Specific prices are set according to gravity (American Petroleum Institute) and producing area.

Canadian Association Starts Work On Sawdust Standards

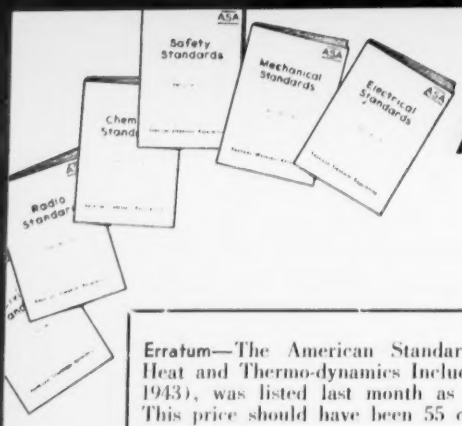
Standard specifications for sawdust and shavings to remove them from the classification of industrial waste and make them commercially usable as insulation materials in buildings have been proposed to the Canadian Engineering Standards Association. The proposal originated from the Ontario Retail Lumber Dealers Association, and the Forest Products Laboratories. A questionnaire sent to engineers, architects, building inspectors, lumbermen, and others throughout Canada brought from 500 to 600 replies which indicated that sawdust and shavings might be commercially valuable if put to use in this way.

The Canadian Engineering Standards Association already has a committee under way to carry forward the standardization program.

Bag Manufacturers Organize for Standards Program

With standardization and simplification as its most important purpose, the Specialty Flexible Container Manufacturers Institute has just been organized by a group of specialty bag manufacturers. The group elected Gordon Friend of the Thomas Royal Company, Philadelphia, as president.

In addition to finding ways of using critical materials most economically, the new institute will also undertake research on post-war markets for new products now being developed for the Army, Navy, and lend-lease. The packages manufactured by the members of the new organizations are being used to pack ordnance equipment, parts, and dehydrated foods. The packages are made of paper, cellophane, hammered aluminum, glassine, and other flexible materials.



ASA Standards Activities

American Standards

Erratum—The American Standard, Letter Symbols for Heat and Thermo-dynamics Including Heat Flow (Z10.4-1943), was listed last month as available for 25 cents. This price should have been 55 cents.

Standards Available Since Our August Issue

Accelerated Ageing of Vulcanized Rubber by the Oxygen-Pressure Method, Methods of Test (ASTM D572-42) American Standard J4.1-1943 25¢

Accelerated Ageing of Vulcanized Rubber by the Oven Method, Methods of Test (ASTM D573-42) American Standard J5.1-1943 25¢

Apparatus Bushings (AIEE 21-1941) American Standard C76.1-1943 40¢

Reference Data and Arrangement of Periodicals American Standard Z39.1-1943 20¢

Road and Paving Materials A37
- Methods of Test
  - Determination of Bitumen (ASTM D9-42) American Standard A37.3-1943 25¢
  - Amount of Material Finer Than No. 200 Sieve in Aggregate (ASTM C117-37) American Standard A37.4-1943 25¢
  - Specific Gravity and Absorption of Coarse Aggregate (ASTM C127-42) American Standard A37.5-1943 25¢
  - Specific Gravity and Absorption of Fine Aggregate (ASTM C128-42 American Standard A37.6-1943 25¢
  - Abrasion of Coarse Aggregate by Use of the Los Angeles Machine (ASTM C131-39) American Standard A37.7-1943 25¢
  - Sieve Analysis of Fine and Coarse Aggregates (ASTM C136-39) American Standard A37.8-1943 25¢
  - Distillation of Tar Products Suitable for Road Treatment (ASTM D20-30) American Standard A37.9-1943 25¢
  - Softening Point of Bituminous Materials (Ring-and-Ball Method) (ASTM D36-26) American Standard A37.10-1943 25¢
  - Ductility of Bituminous Materials (ASTM D113-39) American Standard A37.11-1943 25¢
  - Proportion of Bitumen Soluble in Carbon Tetrachloride (ASTM D165-42) American Standard A37.12-1943 25¢
  - Residue of Specified Penetrations (ASTM D234-36) American Standard A37.13-1943 25¢

Standards Available—(Continued)
- Sieve Analysis of Mineral Filler (ASTM D546-41) American Standard A37.14-1943 25¢

Wet Tests (AIEE 29-1941) American Standard C77.1-1943 40¢

Standards Approved Since Our August Issue

Safety Code for Jacks American Standard B30.1-1943

Safety Code for the Use, Care and Protection of Abrasive Wheels American Standard B7-1943

Standards Being Considered by ASA for Approval

Allowable Concentration of Lead and Certain of Its Inorganic Compounds Z37.11

Basic Sulfate White Lead, Tentative Specifications for (ASTM D82-42T) Revision of American Standard K7-1941

Chemical Analysis of Alloys of Lead, Tin, Antimony and Copper (ASTM B18-36T) Revision of K5-1922

Chrome Yellow and Chrome Orange, Tentative Specifications for (ASTM D211-42T) Revision of American Standard K27-1941

Circular and Dovetail Forming Tool Blanks Revision of B5.7-1936

Copper-Base Alloy Forging Rods, Bars, and Shapes, Tentative Specifications for (ASTM B124-42T) Revision of American Tentative Standard H7-1939

Ferrous Plugs, Bushings, Locknuts and Caps with Pipe Threads B16.14

Machine Tapers, Self-Holding Taper Series B5.10

Shafting and Stock Keys Revision of B17.1-1934

Standards Submitted for Consideration Since Our August Issue

Household Refrigerators B38
- Method of Computing Food Storage Volume and Shelf Area of Automatic Household Refrigerators B38/25
- Test Procedures for Household Electric Refrigerators (Mechanically-Operated) B38/26

Industrial Control Apparatus Revision of C19-1928

New Project Approved

Safety Code for Bakery Equipment

American War Standards

Standards Under Way

Color Code for Lubricants for Machinery Z47

Components for Military Radio C75
- Capacitors
  - Fixed Ceramic-Dielectric Capacitors C75/381*
  - Fixed Molded Paper-Dielectric Capacitors C75/221*
  - Paper-Dielectric Capacitors
- Crystals
  - Crystals and Holders—Aircraft Radio Type
- Dynamotors
- Insulating Materials
  - Glass Radio Insulators C75/275*
  - Plastics
  - Laminated Thermosetting Plastic Materials (Sheet and Plate)
  - Molded Thermosetting Plastic Materials
  - Thermoplastic Materials (Rigid)
  - Porcelain Radio Insulators
- Resistors
  - Composition Potentiometers and Rheostats
  - Fixed Composition Resistors

Standards Under Way—(Continued)
- Fixed Wire-Wound Resistors (Power Type)
- Accurate Fixed Wire Wound Resistors (1 Percent Maximum Tolerance)
- High-Power Variable Wire-Wound Resistors
- Low-Power Variable Wire-Wound Resistors
- Toggle Switches
- Vibrators

Cylindrical Fits B4

Goggles and Respiratory Equipment, Standardization and Simplification of Z2

Machine Tool Electrical Standards Revision of C74-1942

Packages for Electronic Tubes Z45

Replacement Parts for Civilian Radio C16
- Volume Controls (Home Receiver Replacement Type)

Resistance Welding Equipment

Safety in Electric and Gas Welding and Cutting Operations

Screw Threads B1
- Acme Screw Threads for Aircraft
- Truncated Whitworth Screw Threads

Sizes of Children's Garments and Patterns L11

Welding Arc Hand Shield and Helmets Z2

Women's Industrial Clothes and Safety Clothes L17

* Printed draft is available.

News About ASA Projects

(Where it is indicated that draft standards are available, interested groups may obtain copies by writing to the American Standards Association)

Allowable Concentrations of Toxic Dusts and Gases (Z37)

Lead and Certain of Its Compounds—The proposed standard is now before the Standards Council for final approval.

Circular and Dovetail Forming Tool Blanks (B5.7)

A proposed revision of the 1936 edition of this American Standard has been submitted to the ASA for approval. It was prepared by Technical Committee 10, on Forming Tools and Holders, of ASA Committee B5 on Small Tools and Machine Tool Elements. Chairman of Technical Committee 10 is W. C. Mueller, Western Electric Company. The proposed revision has been submitted to the Mechanical Standards Committee for a recommendation to Standards Council.

Color Code for Lubrication of Machinery (Z47)

A draft of a proposed American War Standard for color designations of oils and greases intended to facilitate the application of the right kind of lubricant to a given set of machine parts has been sent out to a canvass of a selected list of key individuals for comment. The draft was developed by an ASA War Committee under the chairmanship of C. B. Veal, Cooperative Research Council.

Industrial Control Apparatus (C19)

A draft standard is being considered by the Committee on Scope of the Electrical Standards Committee.

Resistance Welding Equipment (C52)

A War Committee has been organized. A draft standard on resistance welding electrodes and electrode holders, and seam-welder bearing shafts and bushings is about to be distributed for comment. A draft standard on the design and construction of resistance welding machines and their controls is being prepared for circulation.

Safety in Welding (Z49)

A War Committee has been organized and recently held its first meeting.

Women's Industrial and Safety Clothing (L17)

The subcommittee on safety clothing will meet in Chicago on October 4 and 5 in order to discuss comments and criticisms received on the first drafts of proposed standards on leggings, cape sleeves, and leather aprons. A first draft of a proposed standard on leather welding gloves will also be considered at this meeting.

A request has been received from the War Production Board to enlarge the scope of this project to include men's safety clothing.

A complete list of available standards can be obtained by writing to the American Standards Association.

New Committee Will Exchange Conservation Data with Britain

Howard Coonley, director of the WPB Conservation Division, has been named chairman of a combined conservation committee which will serve as the American medium for exchange of information on conservation work in the United States, Canada, and the United Kingdom. It will include in its membership both British and American representatives.

An Anglo-American Conservation Committee was set in London last February with the same functions in the United Kingdom as the American combined conservation committee will have in the United States.

Announcement of the organization of the American committee and appointment of Mr. Coonley was made by William L. Batt, vice-chairman of the War Production Board and American member of the Combined Raw Materials Board. Mr. Batt explained that the purpose of the committee is to correlate the conservation work done in the United States and Great Britain by the active interchange of information on conservation measures developed here, in Canada, and in the United Kingdom. The committee's work will be concerned with savings through simplification, standardization, and the use of alternative materials, he explained. A preliminary interchange of such information has already enabled the British to reduce requirements for iconal, alloy of nickel and copper, by 20 per cent in 1943. It has also made it possible to substitute steel for brass for the bases of electric light bulbs and enabled American manufacturers to substitute other metals for monel metal in many cases.

A deputy chairman of the new committee will be appointed by the British members of the Combined Production and Resources Board and the Combined Raw Materials Board.

U. S. Navy Uses War Standard Safety Shoes

The American War Standard Specifications for Protective Occupational Footwear have been adopted by the U. S. Navy Department for use in all Naval Shore Establishments. Only those suppliers of protective occupational footwear whose shoes conform to these standards are to be recommended by the Establishments as acceptable sources of supply.

The standards cover men's and women's safety-toe shoes, conductive shoes, and explosives-operations (non-sparking) shoes, as well as men's electrical hazards shoes.

Standards for Radio Cable

Quality specifications for two synthetic rubber products and one plastic material for high-frequency flexible cable used in military radio and radar are to be developed by committees recently appointed at a meeting held by the High-Frequency Flexible Cable Industry Advisory Committee with the War Production Board.

The specifications will be sent to WPB with the recommendation that they be used as a basis for the allocation of materials.

New uses for grinders, higher speeds, new types of wheels have led to revision of the

Safety Code for the Use, Care, and Protection of Abrasive Wheels (B7-1943)

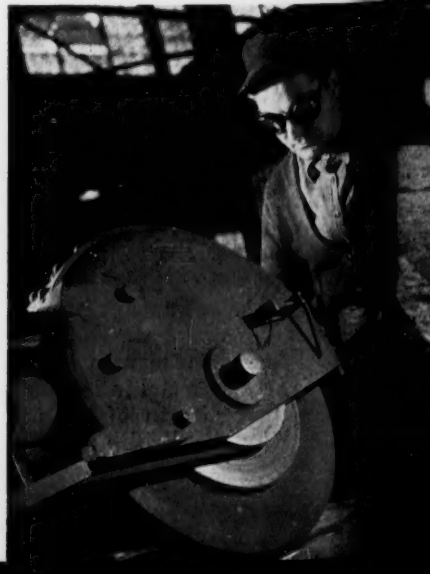
75¢ per copy

The entire code has been carefully reviewed. New rules and tables are drawn from the collective experience of the grinding wheel manufacturers and the users.

The standard covers: General rules for operation; Basic speed tables for all types of wheels in use; Proper control for higher speeds; Relationship between testing speed and operating speed; Protection hoods for portable grinders. Grinding operations for which entirely new rules have been written include: Crankshaft grinding; Camshaft grinding; Thread grinding.

Developed under the leadership of:

The Grinding Wheel Manufacturers Association
International Association of Industrial Accident Boards & Commissions



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